CHEMICAL MARKETS

THE BUSINESS MAGAZINE OF CHEMICAL INDUSTRIES

VOLUME XXXIII AUGUST, 1933 NUMBER 2

Contents for August, 1933

NRA
MEMBER
U.S.
WE DO OUR PART

Regular Departments

CHEMICAL MARKETS *is indexed regularly in the* INDUSTRIAL ARTS INDEX

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Williams Haynes
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CHEMICAL MARKETS

VOLUME XXXIII NUMBER 2

Debts and the Depression

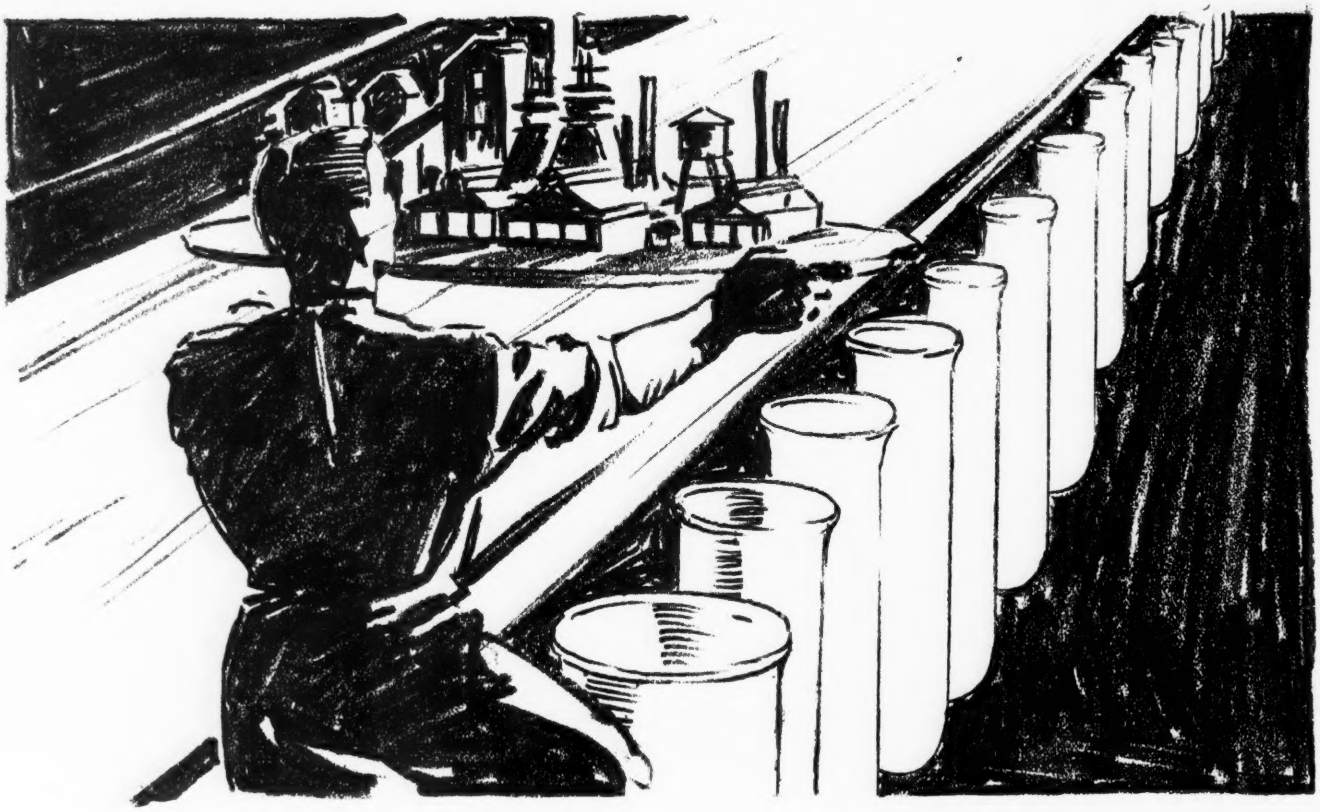
IS BUSINESS bad because of debts, or are debts bad because of business? A provoking inquiry this, recently propounded by Roland Faulkner.

Habitually we associate debt with consumption and credit with production. Debt is the emblem of extravagance. We think of the debtor as a spendthrift. Credit, on the other hand, is the symbol of hope, energy, and enterprise, and we hear it extolled as one of the best of our modern tools of business. We forget that the corollary of credit is debt. If credit is good and wise; then debt cannot be bad and foolish. Under normal business conditions, therefore, the long term indebtedness of the country is in reality a measure of constructive activity, a process by which wealth is transformed into capital, since by far the greater portion of our long-term indebtedness has been incurred for productive or investment operations.

But these are not normal conditions and today, so it is claimed, that the debts of the country, because of the fall in prices, are a drag upon recovery, a damper on enterprise, a burden upon producers, all to an extent that they impair our national wealth and actually hurt our national productive capacity. If these charges are true, the debt problem is a menace.

The fall of prices affects seriously only long-term indebtedness. Debts incurred for current consumption are entirely upon the basis of the current scale of prices, wages, taxes, and interest. Even long-term leases or insurance premiums are in a measure for current occupancy or protection. Mortgages or bonds, however, are distinctly for a past consideration. However, all these debts are listed in the staggering totals of American indebtedness we hear discussed, and even more important than this is the fact that not even all long-term debts must be repaid at the present price level. As an example, Moody's estimate of the maturity of the current corporate debt of the country is that only 10 per cent. of the $350 billions is due for payment this year.

In this light our burden of debt shrinks greatly. Difficult as the problem of meeting interest changes and making refunding arrangements has been, this is a corporate or an individual problem---personal rather than national---and while these personal aspects are painful, in the broader economic sense the peril of indebtedness is not serious.



ONLY CHANGE IS CONSTANT

No business can escape change. New materials are discovered, new uses for old materials or new combinations of existing chemicals—and certain lines of industry thrive and profit. Others caught napping are destined to relinquish leadership.

The world advances as the chemist discovers—industry applies. Swann Research has been responsible for major refinements in production of known chemicals and has also provided industry with materials possessing new properties.

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- Di Sodium Phosphate
- Tri Sodium Phosphate
- Sodium Acid Pyrophosphate
- Mono Ammonium Phosphate
- Di Ammonium Phosphate
- Mono Calcium Phosphate (H T Phosphate)
- Di Calcium Phosphate
- Tri Calcium Phosphate

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Costs and Prices Those provisions of the NRA which were to permit business to control itself are receiving short shift from the Administrator and his Deputies. In the panicky scramble to shorten hours and raise wages, the precedent established in the silk dyers' code, which was approved by the President for its labor conditions only, is being followed wherever there are provisions covering costs and prices that call forth any serious protests. It is evident too, that the administration is conscientiously pulling the teeth out of codes that would really prevent selling below cost or would make effective price fixing possible.

This may be a perfectly honest postponement of matters that the administration puts second to its re-employment campaign, but the industries of the country cannot but be deeply concerned with this official indifference to what is to them the most vital part of recovery. Until business generally again becomes profitable, the depression is still with us. Unless business generally is profitable, the whole resources of the Government—not even omitting organized ballyhoo, use of the dangerous and unconstitutional boycott, and ultimately uncontrolled inflation—will not keep the re-employed at work.

It is extremely interesting to compare the various methods of price control which the various industries set up in their codes. By far the commonest is the provision not to sell below cost, but in nine codes out of ten this is little more than a pious wish for there is no method of determining costs, and very imperfect means of checking sales.

Broadly speaking, five different methods of price control that make some pretense at effective enforcement have been proposed. (1) Openly published list prices and agreement to maintain them: the steel code has a carefully itemized provision of this sort. (2) Costs to be determined by uniform, established cost finding systems, as exemplified by the electrical manufacturers' manual of cost accounting. (3) Costs to be found by general formula, as proposed by the shipbuilders. (4) Prices to be set and announced by the Association of the Industry, as in the cotton textile code, in which case the administration has reserved the right to review and approve any prices so fixed. (5) Prices to be set by the President, as in the petroleum code.

Whatever method has been suggested to control selling below cost, General Johnson has made it clear repeatedly that he intends to approve any minimum price set and that in advance that he does not approve of price fixing either in principle or practice. He seems quite to have forgotten the recalcitrant chisellers against whom he railed six weeks ago.

Hours and Wages In all the lather over re-employment, little confidence is shown by the administration in the natural forces making for normal reconstruction. The whole NRA program is based on a reversal of the well charted course of recovery, in which (as in the down-swing of the business cycle) wages lag behind price advances. No one seems to remember that we have been through depressions as serious before and come out of them, and nobody is willing publicly to admit the cost and risk involved in attempting to reverse a normal economic process. Subconsciously, this apprehension accounts for the haste in Washington and the hesistancy in industry.

The minimum wage-hours blanket of the President's re-employment agreement leaves many feet sticking out in the cold. It is based upon the sociologist's conception of minimum rates determined upon a theoretical scale of living, while the industrialist's must be based upon labor cost in relation to selling price. The points of view are opposite, though not of necessity opposed. The complications and injustices wrought by the blanket agreement are being glossed over, and the impression is being created that the standard rates are fair and that any employer who does not sign up is being unfair to his work people. In the chemical industries, wages are generally above the blanket minimum, but the principle involved is a highly dangerous one, especially when coupled with an official boycott.

Although labor has had distinctly the best hands of the "new deal," the first flagrant violation of an approved code was by the employees of a cotton textile mill in South Carolina who went on strike because the code wages were not as high as they claimed had been promised. The veritable epidemic of strikes—several of them called in protest of codes while up for official approval—displays an attempt at profiteering which organized labor has never been slow to make when conditions were opportune. In view of the fact that the whole labor situation is at the moment highly artificial, this attitude deserves less sympathy in Washington than apparently it is getting. Again, we come back to the basic proposition that the whole re-employment campaign will only succeed if business generally can be made profitable.

CHEMICAL ALLIANCE CODE

of Fair Competition for the Chemical Industry

To effectuate the policy of Title I of the National Industrial Recovery Act, the following provisions are established as a Code of Fair Competition for the Chemical Industry.

ARTICLE I—Definitions

(a) The term "Chemical Industry" as used herein shall be construed to include all manufacturers of any chemical product in establishments, or any part or parts thereof, covered by this Code. Subsidiaries which conduct manufacturing operations or services in conjunction with the operations of the parent company may be included.

(b) The term "Alliance" as used herein means The Chemical Alliance, Inc., a non-profit sharing corporation organized and existing under the laws of the State of Connecticut. A copy of the Constitution and By-Laws of said corporation is attached hereto marked "Appendix A." The membership of said corporation is representative of the Chemical Industry.

(c) The term "employees" as used herein means all persons employed in the establishments, or any parts thereof, covered by this Code.

(d) The term "effective date," as used herein, means the tenth day after this Code has been approved by the President of the United States.

ARTICLE II—Hours of Labor

On and after the effective date, no person employed within the Chemical Industry shall be permitted to work more than an average of forty hours per week during the effective period of this Code nor more than forty-eight hours during any week, but such limitations shall not apply to:

(a) Any person employed in an executive, administrative, supervisory and/or technical capacity, or as an outside salesman;

(b) Any person employed as repairman, engineer, electrician, loader, truck driver, cleaner or watchman; provided that, no person specified in this sub-paragraph (b) shall be permitted to work during any three months period a total of more than ten per cent. in excess of the total hours during any three months period determined by the average of forty hours per week.

(c) Those departments or divisions of the Chemical Industry in which season or peak demand places an unusual and temporary requirement for production upon such departments or divisions, except that in such cases no employee shall be permitted to work more than an aggregate of ten per cent. in excess of the average of forty hours per week above provided.

(d) Employees engaged on continuous operation at places where adequate supply of qualified labor is not available and cannot reasonably be made available and where restriction of hours of such employees would unavoidably reduce production. In such cases the average weekly hours may not be in excess of forty-eight hours per week.

(e) Cases of emergency, provided that at the end of each calendar month any such employer in the Chemical Industry shall report to the Alliance, in such detail as may be required by the Executive Committee, the number of man hours so worked, giving the emergency reasons therefor, and the ratio which such emergency man hours bear to the total number of man hours during said month.

ARTICLE III—Minimum Wages

On and after the effective date the minimum wages paid by any employer in the Chemical Industry to any employee, including accounting, clerical, office and sales employees, shall be not less than forty cents per hour, or at the rate of forty cents per hour if paid on other than an hourly basis, unless the hourly rate for the same class of work on July 15, 1929, was less than forty cents per hour, in which latter case the minimum wages paid shall be not less than the hourly rate paid on July 15, 1929, and in no event less than thirty cents per hour, except that

(a) The minimum pay for apprentices shall be not less than eighty per cent. of the minimum pay provided above, but apprentices shall not be paid less than the minimum regular pay after one year of employment.

(b) The minimum pay for service employees (such as watchmen, gatemen and porters) shall be five cents per hour less than the minimum wage hereinbefore provided for.

In the case of any employee whose compensation is based upon a measure other than time, the total compensation paid shall be no less than such employee would be entitled to receive if his compensation were measured by a time rate.

ARTICLE IV—Child Labor

On and after the effective date, no employer in the Chemical Industry shall employ any person under the age of sixteen years.

ARTICLE V—Administration

The Alliance is hereby appointed an agency for the following purposes:

(a) To collect from the members of the Alliance all data and statistics which may be called for under this Code, or required by the President, or reasonably pertinent to effectuate Title I of said Act. Any data and/or statistics of a confidential nature shall be collected by a firm of Certified Accountants or other suitable agent selected by the Alliance, and not a member or connected with a member of the Chemical Industry.

(b) To represent the Chemical Industry in conferring with the Administrator with respect to the application of this Code and of said Act, and any regulations issued thereunder, and hear complaints, and if possible adjust the same, and to coordinate the administration of this Code with such codes, if any, as may affect any sub-division of the Chemical Industry, with a view to providing joint and harmonious action upon all matters of common interest, and to receive any proposals for supplementary provisions of amendments of this Code or additional codes applicable to the Chemical Industry or subdivisions thereof; provided, however, that as regards all matters mentioned in this paragraph (b) said Alliance shall not have the power in any way to bind the Chemical Industry or any sub-division thereof.

(c) The duties of the Alliance above enumerated shall be exercised by action of its Board of Directors and/or its members as provided in its Articles of Association, Constitution and By-Laws. The Alliance may delegate any of its duties to such agents and committees as it may appoint, whose personnel, duties and powers may be changed by the Alliance from time to time.

ARTICLE VI

Any establishment operating under the provisions of this Code which is not a member of the Alliance shall pay to the Alliance a share of the expenses of the administration of this Code on the same basis as if it were a member.

ARTICLE VII

If any employer in the Chemical Industry is also an employer in any other industry, the provisions of this Code shall apply to and affect only that part of the business of such employer which is a part of the Chemical Industry.

ARTICLE VIII—Employee Organization and Bargaining

(a) Employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection.

(b) No employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing.

(c) Employers shall comply with the maximum hours of labor, minimum rates of pay, and other conditions of employment, approved or prescribed by the President.

ARTICLE IX

Nothing in this Code shall be interpreted in such manner as to impair in any particular the constitutional rights of the employee and employer to bargain individually or collectively as may be mutually satisfactory to them, and nothing in this Code shall prevent the selection, retention or advancement of any employee on the basis of his individual merit without regard to his affiliation with any labor or employee organization.

ARTICLE X

The President of the United States may, from time to time, cancel or modify any order, approval, license, rule or regulation issued under Title I of the National Recovery Act.

ARTICLE XI—Amendments or Additional Codes

Supplementary provisions or amendments to this Code or additional codes or fair trade practice rules applicable to subdivisions of the Chemical Industry may from time to time be submitted in behalf of the Chemical Industry or any sub-divisions thereof for the approval of the President.

ARTICLE XII

Any sub-division of the Chemical Industry, recognized by the Alliance, operating under the provisions of this Code may elect, in accordance with the Constitution and By-Laws of its association or institute, or if no association or institute exists, as the members of such sub-division may determine, to sell its products only upon open prices, terms and conditions publicly announced by each member of such sub-division. Any changes in prices by any member of such sub-division shall be announced by such member immediately to all other members of the sub-division through such agency as the sub-division may determine. Variations from such open and publicly announced prices, terms and conditions shall not be allowed.

ARTICLE XIII

By presenting this Code, and the specific provisions of Articles II and III hereof, those who have assented hereto shall not be bound by any modification thereof, except as each shall thereto subsequently agree.

ARTICLE XIV

The provisions of this Code shall expire on December 31, 1933, or on the earliest date prior thereto on which the President shall by proclamation, or the Congress shall by Joint Resolution, declare that the emergency recognized by Section I of the National Industrial Recovery Act has ended.

This instrument may be executed in several counter parts, each of which shall be deemed to be an original, which together shall constitute one instrument.

Approved:

..........Company

by its officer signing below who is duly authorized to execute this assent in its behalf, viz.

....

President.

Dated,..........1933.

Attest:

.... (SEAL)

Secretary.

Coding the Chemical Industries

Chemical industry co-operating with President Roosevelt and the N. R. A. program has revived the wartime Chemical Alliance as the best medium of coordinating the various divisions of the industry on basic problems of wages, hours of labor, etc.

Major General C. C. Williams is the man chemical industry will soon closely contact in Washington. He will have, as a deputy administrator, supervision over most of the divisions of the chemical industry.

CHEMICAL industry's response to N. I. R. A. is a revived Chemical Alliance. At an all-day meeting Aug. 3, at the Hotel Biltmore in New York City, attended by a large group of the industry's leaders, definite plans so that the industry as a whole may work smoothly and efficiently under the "rules" now laid down for business, were formulated. A tentative code was discussed and sent down to Washington for a Code conference. Committee, Lammot du Pont, A. K. Hamilton, William B. Bell, and J. W. McLaughlin, was appointed, and before this issue of CHEMICAL MARKETS is in our readers' hands, a final basic blanket code covering the entire industry only as to minimum wages, hours of labor will be placed before the Alliance directorate and forwarded to Gen. Hugh S. Johnson and his deputies.

At the same meeting, a Statistical Committee, consisting of E. V. O'Daniel, Willard H. Dow, W. D. Tichnor, J. B. Ford, and Leonard T. Beale, was appointed to gather required data on wages, hours, and general economic information that will become a necessity in the immediate future.

A Liaison Committee was also formed to take over the important duty of contacting the various subdivisions of the industry and coordinating activities and codes. On this committee are: August Merz, Charles Belknap, Glenn Haskell, E. M. Allen and F. W. Russe.

As we go to press membership application blanks are being forwarded to all companies who logically belong within the chemical industry and its allied divisions. These are mailed from the office of William B. Bell, president of the Alliance, president of Cyanamid, and newly elected president of the M. C. A. Dues have been fixed at the nominal figure of $10.

Officers expected to head the resurrected wartime Alliance are, in addition to Mr. Bell as president, Lammot du Pont, Orlando Weber, Charles Belknap and Willard H. Dow as vice-presidents; J. W. McLaughlin as treasurer, and Warren N. Watson, secretary. Executive committee will consist of William B. Bell, C. M. Allen, Charles Belknap, Horace Bowker, E. W. Clark, Lammot du Pont, Glenn Haskell, George W. Merck, August Merz, J. W. McLaughlin, A. E. Pitcher, Willard H. Dow and W. D. Tichnor.

After considerable preliminary discussion of various ways and means, the industry's chief executives agreed that the war-time alliance is a splendid foundation upon which to build anew along the lines laid down in the N. I. R. A.

The first purpose of the Alliance is, as has been stated, the drafting of a basic blanket code, very general in character, and largely limited to covering the requirements of the N. I. R. A. with respect to wages and working hours.

The various subdivisions will have the problem of formulating specific codes. The C. A. has already formed several divisions (following the precedence laid down in 1917) and others will be added as the needs become apparent.

Memories of the hectic, frantic war days are revived. The Chemical Alliance,

Inc., was the outgrowth of the Committee on Chemicals of the Advisory Commission of the Council of National Defense. The Committee on Chemicals was formed on May 3rd, 1917, when Bernard M. Baruch, (again a leading figure in the Washington picture) chairman of the War Industries Board, appointed the dean of the chemical industry, William H. Nichols, chairman, and by telegraphic request, summoned E. R. Grasselli, Henry Howard (Merrimac), William Hamlin Childs (Barrett), Horace Bowker, Charles H. MacDowell, J. D. Pennock (Solvay), Edward Mallinckrodt, Jr., and others to Washington for a historic meeting at the Hotel Shoreham on May 9. Various subdivisions were formed at this meeting. In December all committees of the Advisory Commission of the Council of National Defense were discontinued. Committees of the trade took the place of these advisory committees. To the Chemical Committee it appeared desirable to hold intact the organization already formed and the Chemical Alliance was incorporated in Connecticut. This was actually done, several months before the various committees of the Council of National Defense were finally discontinued in December—in fact, the first organization meeting was held August 1st, 1917, in Washington, at which time Dr. Nichols was elected president, Horace Bowker, vice-president, and J. D. Cameron Bradley, secretary and treasurer. Directors included, besides the officers: E. R. Grasselli, William H. Childs, Charles H. MacDowell, Charles G. Wilson, (Virginia-Carolina Chemical), Henry Howard, J. P. Pennock, Edward Mallinckrodt, Jr., John J. Riker (E. D. and J. J. Riker Co., N. Y. City, now Joseph Turner & Co.), and A. D. Ledoux (Pyrites Co.). Charles H. MacDowell at this time was assisting the government in a dual capacity, for in addition to his connection with the Alliance, he was also chemical representative on the War Industries Board.

With the full approval of this board the Alliance was permanently organized at a meeting December 4th, 1917, held in New York City. Dr. Nichols resigned at this time, and his place as president was taken by Mr. Bowker. The directorate was enlarged to include A. W. Hawkes (General); Warner D. Huntington (Davison); F. A. Lidbury (Oldbury Electrochemical); W. N. McIlravy (Barrett); A. G. Rosengarten. From this enlarged group various subcommittee chairmen were selected. The divisions or sections established were: Acid Section; By-Products of Coal and Gas Section; Foreign Pyrites; Electrochemicals; Fertilizers; Miscellaneous Chemicals; Alkalies; Domestic Pyrites and Sulfur; Dyestuffs and Intermediates; Tanning Extracts; Insecticides; Disinfectants. With this organization perfected the Chemical Alliance predominated the organized effort of the chemical industry to prosecute the war to a successful termination.

At the second annual meeting, held in New York City, January 3rd, 1919, the question naturally arose as to whether the Alliance should continue in peacetime. It was then determined to carry on. In most quarters it was felt that the Alliance could perform very useful functions along patent lines, dissemination of foreign trade information, determination of acceptable cost accounting systems, publication of statistics, etc. A Washington office was maintained in connection with the N. F. A. and the M. C. A.

A. D. Whiteside is still another deputy administrator with chemical industry codes on his list of assignments.

Sentiment very quickly changed, however, during 1919, and at a meeting in New York, December 10th, it was decided to discontinue the activities of the Alliance, but that the charter should be retained. American industry embarked upon a decade of rugged individualism in which an organization such as the Chemical Alliance could play little or no part. Having completed a cycle and charged again by the "New Deal" with the task of close cooperation, chemical industry has dusted off the old charter and with a few minor changes has determined that the Alliance will again serve a definite purpose in another major crisis.

While the set-up today has strong resemblances to that brought into being in 1917, the directorship indicates what changes time can bring about in a decade. The list of 1917 bears little resemblance to the present group consisting of E. M. Allen (Mathieson); Leonard T. Beale (Penn. Salt); W. B. Bell (Cyanamid); H. L. Derby (Cyanamid); Lammot du Pont; J. N. Forker (American Tar Products); T. S. Grasselli; C. P. Gulick (National Oil Products); A. K. Hamilton (Franco-American Chemical); Glenn Haskell (U. S. I.); George W. Merck; August Merz; J. W. McLaughlin (Carbide); A. E. Pitcher (du Pont Viscoloid); Edgar Queeny; F. W. Russe (Mallinckrodt); John Stauffer; Irving Taylor (Michigan Alkali); W. D. Tichnor (Commercial Solvents); Ernest T. Trigg (John Lucas); Charles Belknap (Merrimac, also M. C. A. executive committee chairman); Horace Bowker (A. A. C.); E. W. Clark (Barrett); Peter Dougan (Merck); Willard H. Dow; R. H. Dunham (Hercules); J. P. Elkinton (Phila. Quartz); E. K. Halbach (General Dyestuff); H. O. C. Ingram (General Chemical); F. J. King (Linde Air Products); Leland Land (Atlas Powder); C. A. Sanders (Cadillac Soo Lumber); William B. Thom (Warner & Westvaco); Orlando Weber (Allied); E. H. Westlake (Tenn. Corp.); and John J. Watson (I. A. C., and new N. F. A. president). Aside from Mr. Merz, Mr. Watson and Mr. Bowker, none of the present directors were connected with the Alliance in the war-period.

On July 25th, Mr. Bell addressed a letter to all associations and institutes of a chemical character suggesting the advisability of joining the Alliance. In it he pointed out that to comply with the government's earnest desire for speed the former officers of the Alliance had resigned and new ones designated. A new constitution and by-laws have been drawn up, subject to amendment at any time. One particularly important point stressed in Mr. Bell's letter was the fact that like its predecessor the newly formed Alliance is called into being because of an emergency and that the Alliance will terminate with the end of the national recovery act (which is two years duration, unless further life is added by legislation).

The new constitution drafted for the Alliance is short and specific, and consists of 11 articles:

Article I

Objects

The purpose of this organization, as expressed in its articles of association, shall be exercised in such a manner as to provide for carrying out the purposes of the National Recovery Industrial Act.

Article II

Name

The name of this organization shall be "The Chemical Alliance, Incorporated."

Article III

Membership

Section 1—Any individual firm or corporation engaged in the manufacture of chemicals in the United States whose application is approved by the board of directors may become a member in the organization upon the payment of dues, as hereinafter provided.

Section 2—Where membership is held in the name of a corporation or a firm, one individual representing the corporation or firm shall exercise the voting power of the membership.

Article IV

Organization

The Chemical Alliance, Incorporated, shall be an alliance of all branches of the chemical industry, and the board of directors shall create such divisions within the Alliance as may from time to time be necessary.

Article V

Dues

Section 1—Each firm or corporation holding active membership shall pay ten dollars ($10) annually in advance so long as such membership shall continue.

Section 2—In addition to the above-mentioned dues, assessments against the members of this corporation may be made from time to time by order of the board of directors to provide necessary funds for the proper operation of the corporation, and the amount of the total assessment made at any time shall be prorated among the members on the basis of the number of votes such member is entitled to cast at any meeting of members.

Major R. B. Paddock, another "Johnson army man," who will assume responsibility for codes in the chemical industry.

Article VI

Officers

Section 1—The officers of this organization shall be elected by the board of directors and shall be a president, one or more vice-presidents, a treasurer and a secretary, and such other officers as the board of directors may elect. The president and the vice-president must be members of the board of directors, but any other officer may or may not be a member of the board. The offices of the secretary and treasurer may at the direction of the board of directors be combined.

Section 2—Officers shall hold office for one year or until their successors are elected.

Article VII

Board of Directors

Section 1—The board of directors shall consist of such number of persons (not less than three (3), nor more than the maximum provided for in the articles of association, as the same may be amended from time to time) as shall have been duly elected to serve on said board, whose term of office has not expired and who has not ceased to be a member of the board by reason of death, resignation, or otherwise.

Section 2—The board of directors is empowered to transact all business pertaining to the organization.

Section 3—Regular meetings of the board of directors shall be held at such time and place as may be determined upon by the board and three (3) days' notice of such meetings must be given to such members of the board of such regular meetings. Special meetings of the board may be held at the call of the president or vice-president or the secretary on one day's notice to all the members at such time and place as may be stated in such notice. The members of the board present at any meeting shall constitute a quorum. Any notice of a meeting to be given to any member of the board may be waived by such members either before or after the meetings.

Article VIII

Meetings of Members

Section 1—Regular meetings—After the year 1932, the annual meeting of the members of the organization shall be held each year on the first Monday of November (or if it be a holiday, then on the next business day) at such place and time as the board of directors shall fix. Notice of the time and place of the meeting shall be mailed to each member of the organization at least thirty (30) days prior to the date of such meeting.

Section 2—Special meetings—Special meetings of the members of the organization may be held at such time and place as determined by the board of directors. Notice of the time, place and purpose of any special meeting shall be mailed to each member of the organization at least ten (10) days prior to the date of such meeting.

Section 3—Quorum—A majority of the members or such number of members, exceeding twenty (20), who shall be represented at any meeting by the individual authorized to exercise the voting powers of such member, whichever is the smaller, shall constitute a quorum for the transaction of business.

Section 4—Notice of any meeting of the members required to be given to any member may be waived by such member either before or after such meeting.

Section 5—Each member of the corporation shall be entitled to a number of votes according to the number of employees employed by such member, according to the following table:—

Number of Employees	*Votes*
500 or less	1
501 to 1,000	2
1,001 to 1,500	3
1,501 to 2,000	4
Etc.	

and an increased number of votes for additional employees in the same ratio as provided above.

Article IX

Elections

After July 15, 1933, members of the board of directors shall be elected at the annual meeting by the majority vote of the members present at such meeting to hold office until the next annual meeting, provided, however, that if at any time the membership of the board of directors falls below the maximum permitted by the articles of association of this organization, the board of directors may, if it so desires, elect additional directors (who, with the then directors, shall not exceed a total of said maximum) to serve until the next annual meeting of members.

Article X

Committees

Section 1—There shall be an executive committee which shall consist of the president and not more than twelve members of the board of directors, such committee to be selected by the board of directors and to have authority to transact all business pertaining to the corporation when the board is not in session, and said executive committee shall likewise have authority to appoint other committees either of its own members or from outside its members as it may deem proper.

Section 2—The board of directors shall have power to designate such other committees as it deems necessary to further the interests, purposes and objects of the organization. Members of such committees shall be appointed by the president, and members of such committees need not be directors.

Article XI

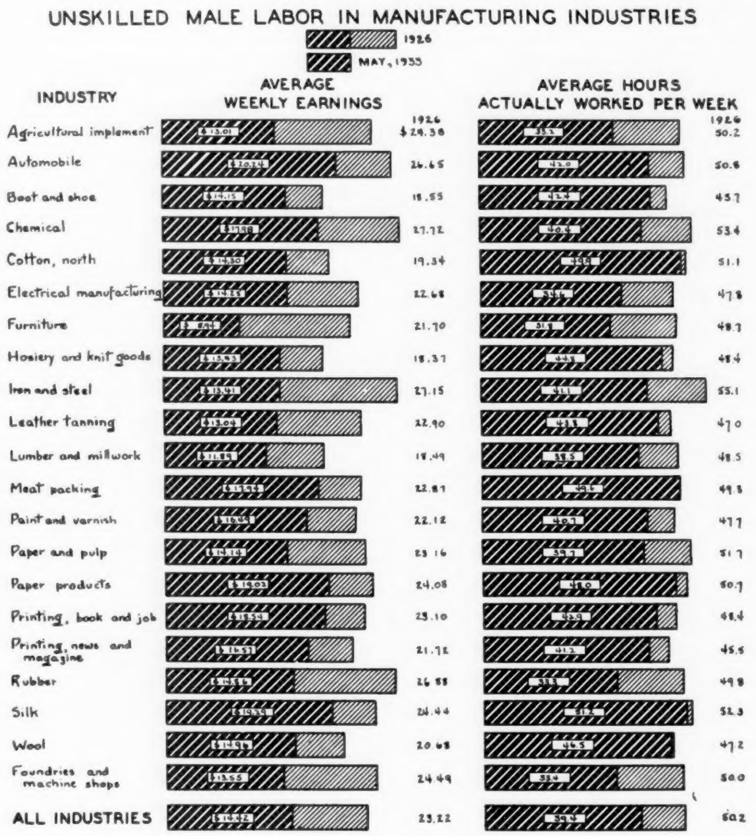
Amendments

The constitution and by-laws of the organization may be altered, amended or repealed by two-thirds vote of the members of the board of directors present at a regular or special meeting, provided that written notice of the proposed alteration or amendment shall have been sent to the members of the board with the notice of such meeting.

Even in one or two instances where codes in fields close to chemicals have been presented there is every likelihood that opposition will develop at the hearings. The paint code is one example. Both the lacquer and the cold water paint makers feel that this code is largely a sales trade agreement and does not protect sufficiently the interests in a way they would like to see. Perhaps the greatest harmony exists in the fertilizer group, in the plastic raw materials group, and in the Insecticide and Disinfectant group.

Briefly, the situation in each of the subdivisions is as follows:

Fertilizers. Working at top speed for three days the Recovery Committee, under N. F. A. President Watson, completed a code on July 29. The code will be shortly submitted to General Johnson and will then be referred to the Code Section of the Recovery Administration and by it in turn to the advisory boards representing labor and the consuming public and also to the Dept. of Agriculture. If all these groups report favorably, General Johnson will then announce a public hearing. This is the general proceeding for all codes.



Hours and earnings in various industries as prepared by the National Industrial Conference Board. It is the avowed intention of the N. R. A. plan to raise wages and decrease hours of labor.

Paints. Eastern paint manufacturers met in New York City, July 28, and finally adopted a code presented by the chairman of the N. P. O. & V. Association's code committee, Ernest T. Trigg. Midwestern and Pacific Coast meetings will be held shortly to register approval or disapproval and the final draft when completed will be submitted to Washington.

The difficulties of working out details, despite an earnest desire on the part of all to give President Roosevelt complete cooperation, are particularly well illustrated by the situation in the paint industry. Many competitive divisions are experiencing all kinds of difficulties in attempting to work harmoniously. The dry color people have drafted their own code. The main provisions of this with respect to hours of labor, minimum wages, method of enforcement are as follows:

On and after the said effective date, as herein defined, no employee in the dry color industry, except executive, administrative and supervisory staffs, color chemists and color matchers, traveling salesmen and watchmen, shall be employed at an average of more than forty hours per week in any four months' period—such period being hereby defined to be, respectively, the first four months of each calendar year; the second four months of each calendar year; and the third four months of each calendar year:—Provided, however, that any such employee shall be permitted to work for not more than forty-eight hours in any one week in any such period, but not so as to exceed the average of forty hours per week during any of such four months' periods; provided further, however, that in case of emergencies it shall be permissible for repair crews and electricians, and their respective assistants, to be employed for more than forty-eight hours in any one week.

On and after the said effective date, the minimum wages of employees in dry color industry, except laboratory apprentices and office boys and girls, shall be at the rate of 40 cents per hour in plants located within 50 miles of New York City, Chicago, Philadelphia, or Milwaukee; and in all other plants, at the rate of 36 cents per hour.

(1) **Reports**—For the purpose of assuring the effective observance of this code, each manufacturer in the dry color industry shall furnish reports at such times and in such form as shall be prescribed by the Dry Color Manufacturers' Association, subject to approval or modification thereof by the Administrator.

The Dry Color Manufacturers' Association, through such committee or representative as it may designate, is hereby constituted as the agency to collect and receive such reports, and to collate and disseminate the same in such manner as may be determined and prescribed by the said association, subject to such rules, regulations and requirements as may be established or prescribed by the Administrator.

(2) **Supervision by Dry Color Manufacturers' Association**—The Dry Color Manufacturers' Association or such committee or representative as it shall designate, is hereby established as the agency to cooperate with the Administrator for the purpose of supervising operations under this code, and requiring observance thereof, and conformance therewith.

In all of the foregoing respects and in all matters relating to this code and to the dry color industry, with relation to the said

National Industrial Recovery Act, the Dry Color Manufacturers' Association shall cooperate with the Administrator; and, subject to such rules and regulations as may be prescribed by the Administrator, the said association shall take all proper and effective measures to prevent violations of this code, and shall submit and furnish all information necessary and proper for the institution of the punitive and remedial measures with respect to such violations, as are prescribed in the said National Industrial RecoveryAct, or as shall be required by any orders, rules or regulations of the Administrator.

In the general paint group, the lacquer manufacturers (particularly those firms which do not make paint or varnish) are not satisfied with the code. More than likely the cold water paint group will offer a separate group and as this is written it seems almost certain that the lacquer manufacturers will do likewise. They have in readiness such a code. They are also proceeding independently to form a Lacquer Manufacturers' Association under Frank G. Breyer.

Linseed Crushers. A conference between linseed crushers and government officials in Washington in the past month resulted in the formation of a tentative code. At the same time the National Linseed Oil Manufacturers' Association was formed with the following officers: president, Howard Kellogg; vice-president, E. C. Bisbee; secretary, V. Wertele; treasurer, J. A. Johansen. These officers with S. M. Archer were appointed an administrative committee.

Tanning Extracts. American Tanning Extract Manufacturers' Association has been formed with Alan G. Goldsmith, president, and Robert C. Griffith (Champion Fibre) as secretary. At a meeting held July 21 discussion of a tentative code was taken up.

Cottonseed Oil Crushers. On July 27, S. M. Harmon, secretary of the Cottonseed Crushers' Association announced that a code would be ready within two weeks embodying an eight hour day. Minimum wage scales are likely to provide a stumbling block.

Mercury. Leading producers have devised a code and formed the National Quicksilver Association with the following officers: President, H. W. Klipstein; first vice-president, Howard Perry; vice-president for Oregon, Robert M. Betts; vice-president for Washington, F. B. Prescott; vice-president for Nevada, H. E. Loufek; vice-president for Arkansas, Noel C. Stern; vice-president for Texas, W. D. Burcham; vice-president for Arizona, Sidney Spitzer; secretary-treasurer, Irving Ballard, San Francisco. The code adopted a maximum working week of 40 hours for mine workers with a minimum wage of $15 per week in the North and West, including Arizona, and a $9 rate for the Southern district on the employment of Mexican labor.

Clay. The American Clay Association held, on June 19th, a meeting at Philadelphia at which 85% of the industry was represented. A code was adopted and forwarded to General Johnson. The Executive Secretary of the Association, George A. Fernley, 505 Arch Street, Philadelphia, is seeking new members. The President is George C. Crossley, president of the United Clay Mines Corp., Trenton, N. J.

Greases. The National Lubricating Grease Manufacturers' Association was formed on July 12th. A code was adopted and forwarded to Washington. The present secretary is Guy Peters, Oil Kraft, Inc., Cincinnati, Ohio.

Plastics Raw Materials. Under the leadership of Du Pont Viscoloid's, president, A. E. Pitcher, a Raw Materials Institute has been formed. Other officers include Bakelite's Rossi, Unyte's Pickhardt. The former secretary of the Cellulose Manufacturers' Association, John E. Walker, has been appointed secretary.

Chemical Specialties. Under the leadership of Foster Dee Snell, Brooklyn consulting chemist, the National Association of Specialty Manufacturers, Inc., has been formed. Letters of invitation have been mailed to over 3,000 concerns manufacturing chemical specialties. The general code is in draft form and will be passed upon in a few days, Sub-groups have started to meet and codes relating to their special groups will be drafted as rapidly as possible. Officers of the group as formed are John Kelly of Nacto Cleaner Corp., and Foster Dee Snell, secretary. It was suggested that oiled mops were properly a part of this group, being so closely related to furniture polish. This classification will probably be added. It appears that the shoe polish people are organized independently and this group may be dropped.

The list of groups tentatively planned for include the following: alkaline cleansers, cleaning solvents, plumbing specialties, household ammonia, furniture polish, automobile polish, metal polish, soap specialties, wax products, adhesives, inks, shoe specialties, greases and special lubricants, miscellaneous automotive specialties, miscellaneous household specialties.

A member of the association may belong to as many of these groups as apply to the products he manufactures. Such additional sub-groups will be formed as are indicated to be desirable. Some of the above may be sub-divided or merged. Because of the large number of moderate sized firms eligible for membership in the association, the dues for the calendar year have been set at $25.00, a sum believed adequate to supply the expense of rendering the service involved. A number of concerns signified their intention of joining such an association previous to its actual formation. Included in this list were the following representative firms: Chas. M. Higgins Co., Polyshine, Inc., Templar Oil Products Co., Solarine Co., Nacto Cleaner Corp., Grady Manufacturing Co., Fidelity Manufacturing Co., C. P. Baker and Co., International Metal Polish Co.

Drugs. The management of the Drug Institute, Inc., (one of the first associations formed under the N. R. A) reports that its membership has expanded to 136 members. H. Lawrence Groves, for several years U. S. Commercial Attache at Berlin, has been selected as secretary. The roster of the Institute's council (manufacturers) is as follows:

F. H. Bedford, jr., Stanco Distributors, Inc., New York; F. A. Blair, Centaur Co., New York; Dr. A. C. Boylston, Mallinckrodt Chemical Works, St. Louis; Henry P. Bristol, Bristol-Myers Co., New York; S. DeWitt Clough, Abbott Laboratories, North Chicago, Ill.; E. H. Cone, S. S. S. Co., Atlanta; A. H. Diebold, Drug Inc., New York; J. W. Ewing, Ligonier, Pa.; George L. Genz, Parke, Davis & Co., Detroit; Glenn Haskell, U. S. Industrial Alcohol, New York; A. J. Horlick, Horlick's Malted Milk Corp., Racine, Wis.; Charles L. Huisking, Charles L. Huisking & Co., New York; E. K. Hyde, Mentholatum Co., Wichita, Kan.; J. R. Jackson, W. T. Rawleigh Co., Freeport, Ill.; Lambert D. Johnson, Mead, Johnson & Co., Evansville, Ind.; R. D. Keim, E. R. Squibb & Son, New York; Gerard Lambert, Gillette Safety Razor Co., Boston; William E. Levis, Owens-Illinois Glass Co., Toledo, Ohio; L. K. Liggett, United Drug Co., Boston.

P. C. Magnus, Magnus, Maybee & Raynard, Inc., New York; Ellery W. Mann, Zonite Sales Corp., New York; William G. Mennen, Mennen Co., Newark; N. H. Noyes, Eli Lilly & Co., Indianapolis; Z. C. Patten, Chattanooga Medicine Co., Chattanooga; W. G. Peckham, Norwich Pharmacal Co., Norwich, N. Y.; S. B. Penick, S. B. Penick & Co., New York; H. C. Richardson, Vick Chemical Co., Greensboro, N. C.; Harlow P. Roberts, Pepsodent Co., Chicago; J. F. Scanlan, Coty, Inc., New York; John G. Searle, C. D. Searle & Co., Chicago; Oscar W. Smith, Parke, Davis & Co., Detroit; Theodore Strong, Strong, Cobb & Co., Cleveland; J. L. Tiffany, Lederle Laboratories, New York; L. N. Upjohn, Upjohn Company, Kalamazoo, Mich.; R. A. Whidden, Bauer & Black, Chicago.

Deputy Administrators and Duties

As the problems of administration of the various codes (once they are finally adopted as well as the preliminary work involved in their final approval) becomes clearer, the more important looms up the figures that wll act as deputy administrators.

Chief of these (for the chemical producers) is Major General C. C. Williams, like his superior, General Johnson, blunt, brief, specific. He served in the army with distinction for 36 years. He graduated from West Point in 1894, served in the artillery in the Philippines, was connected with the ordinance department in various capacities, was chief ordinance officer in France in 1917, returned in 1918 to become chief of ordinance. In 1923 he married Constance Lodge Gardner, daughter of the late Senator Henry Cabot Lodge. His honors, distinctions, and citations are many. He retired on March 31, 1930. In his hands will rest the major divisions of the chemical industry. Others who will handle chemical or chemically allied industries are Major R. B. Paddock (another Johnson army man) who served with distinction in the World War in the Signal Corp., and A. D. Whiteside, a former R. G. Dun & Company official. The official assignments are as follows:

Major Gen. C. C. Williams

332—Turpentine and rosin; 326—Wood preserving (coordinate with Deputy Muir, construction).

600—Chemicals, drugs and paints.

611—Fireworks and explosives; 614.01—Ink (writing); 621—Polishes and blacking; 623—Soap.

602—Alcohol and commercial solvents; 699—Chemicals; 601—Fertilizers.

608—Enameling and japanning; 618—Painter and decorator; 619—Paints and varnishes.

601—Adhesives, cement, paste and glues; 603—Cleaning compounds; 605—Creosoting; 607—Dry colors and dyestuffs; 609—Essential oils; 612—Fish oils; 613—Gums and gutta percha; 614—Ink (printing), etc; 617—Naval stores; 622—Rosin and turpentine; 624—Starches and dextrines; 625 waxes.

900—Leather, leather products and furs.

901—Artificial leather and products; 917—hides, skins and raw furs; 918—leather, except manufacturers; 926—plastic leather; 930—tanners and manufacturers of leather; 932—reptile leather and skins.

1,004—Bakelite products and plastics.

1,200—Non-ferrous metals and their products.

1,207—Bronze Powder.

1,613—Celluloid goods.

A. D. Whiteside

256—Rayon converters; 255—rayon knit fabrics; 257—rayon knit fabric products—underwear (coordinate Deputies Howard and Rogers, knit outer wear); 258—rayon piece goods; 259—rayon yarn.

604—Cosmetics, perfumes and toilet preparations; 698—drugs; 606—drug sundries; 615—insecticides and disinfectants; 616—medicinal oils; drugs, wholesale; drugs, retail; 620—patent or proprietary medicines.

Dudley Cates

700—Petroleum, coal and their products, miscellaneous; 706—Natural gas, illuminating and heating.

Major R. B. Paddock

1614—Chemical laboratory supplies.

N. W. Pickard

327—Woodpulp and celluloid; 400-paper and allied products.

Kenneth M. Simpson

700—Petroleum, coal and their products.

703—Coal by-products; 704—Coke.

705—Fuel oil; 707—Gasoline (coordinate with Deputy Whiteside in charge of filling stations); 708—Kerosene; 709—Natural gas; 710—Oils and greases; 711—Petroleum refining; 712—Tallow and candles.

1,200—Non-ferrous metals and their products.

1,218—Metals, non-ferrous (not otherwise classified), including lead, zinc and tin; 1,217—lead.

Philip C. Kemp

331—Refrigerators.

501—Books; 502—Bookbinders.

626—Tanning materials (coordinate—Deputy Williams, chemicals).

700—Petroleum, coal and their products.

1,200—Non-ferrous metals and their products, aluminum and its products.

1314—Fire extinguishers and appliances.

1414—Railroad supplies.

1600—Miscellaneous industrial; industrial and commercial equipment and supplies—manufacture.

1604—Artists' and draftsmen's materials; 1605—Bakers' and confectioners' supplies; 1606—Beauty parlor and barber shop; 1608—Bottlers' supplies; 1610—Janitor supplies, general; 1611—Butchers' supplies; 1624—Furriers' supplies; 1634—Laundry supplies.

1645—Painters' supplies; 1646—Paper manufacturers' supplies; 1652—Printers' supplies; 1654—Restaurant and hotel supplies; 1655—Shoe manufacturers' supplies; 1658—Tanners' supplies.

Numbers in each case refer to Dun and Bradstreet code classifications with necessary additions.

Will the National Recovery Act Cartelize American Industry?

By Lewis H. Marks

Dr. Marks' contacts with Germany, maintained since his student days at Frankfurt, and his experience as Executive Director of the Alcohol Institute, fit him perfectly to contrast the German Cartel with what the Industrial Recovery Act empowers trade associations to do.

OUR new Industrial Recovery Act and the German Cartel Law of 1922 are startlingly similar. Each provides for the organization and control of voluntary trade associations for the benefit of the whole people. At a time, therefore, when the chemical industries are very deeply concerned with the outcome of this new and revolutionary legislation and its effects upon the industrial life of this country, it is extremely pertinent to examine what has been the experience of German industry under the cartel system. The result has been rather astonishing—indeed, distinctly disconcerting to those who believe that a carefully drawn code is the solution of all industrial problems.

The parallelism between the German cartel and the American trade association under General Hugh S. Johnson as Industrial Administrator, is quite pertinent. The German cartel draws up an agreement in the form of a contract setting forth definite terms with definite penalties for violation, the whole to run for a definite period of time. This cartel agreement, like our new industrial codes, must be filed with the government. Once so officially recorded, the cartel agreement is binding upon all of its members, but any violation of the code of it may be enforced in the Cartel Court. No member may withdraw from the cartel without the permission of the Court, or of the Minister for Economic Affairs. If, however, the cartel establishes a monopoly and uses its power contrary to the best interests of the industry as a whole or the people as a whole, these practices may be ordered discontinued, or in extreme cases, upon order of the Minister for Economic Affairs, the cartel may be disbanded. If we substitute for cartel, trade association; put in the place of the Minister for Economic Affairs the Federal Industrial Administrator and for the cartel court his aides and sub-administrators, the legal framework of the two are practically identical.

It is interesting at the outset to note that Germany is the only large country where no laws actually against restraint of trade have ever been passed and where contracts to limit production or to sell at prearranged prices have long been enforced at law. The economic power of cartels, the general name given to all types of trade associations in Germany, is therefore much greater than in Great Britain or France where agreements in restraint of trade are not legally enforceable although they are not illegal in the sense of the American anti-trust laws. In Germany, the concept of freedom of trade means not only that the independent enterprises are free to compete at will but also that they are at liberty to combine. In Great Britain and France, therefore, the effectiveness of cartel or trade association depends on the loyalty and cooperation of their members who can, at any time or for any reason, leave the association and enter into competition with it.

Both the American trade association and the cartels of Europe are undoubtedly evolutionary products of their respective economic environments, and must be considered in this light. The first trade association was formed in the United States in 1854, but the movement did not acquire much momentum, until a few years after the Civil War. In the early phase of their development, some trade associations assumed

the form of pools or voluntary associations of producers which very frequently endeavored to secure profits for their members by monopolistic price control, limitation of output, or allocation of territories and customers. Many of these failed, not through external pressure, such as governmental regulation, because we did not have restrictive laws until 1890, although, of course, our common law always did guard duty; but because they operated against the fundamental law of economics—the law of supply and demand—and above all contrary to human nature.

The terms of an agreement, containing elements of price fixing or other restraints of trade, which could not be enforced at law, and which were very frequently verbal understandings, were not carried out in times of slackening demand and accumulating inventories. The result was the dissolution of the association or pool. A few of these early, unsuccessful, cooperative efforts, which failed because of the absence of laws to enforce such agreements, and because human nature is apparently not equal to prolonged commercial sacrifice, may be recorded here.

Reasons for Some Failures

1. The Saginaw and Bay Salt Association was organized in 1868. It failed in 1871, because of price cutting by the members.

2. The Distillers or Spirit Pool was organized in 1881. It broke up in 1882. It was reorganized several times between 1883 and 1887. It was later frequently reorganized but never really functioned because some one or more of its members would break the agreement to keep prices at certain levels.

3. The Beam Pool was organized in 1887, broke up in 1891 because of the usual disagreement among the members.

4. The Bessemer Steel Association was organized in 1896. It also quickly broke up because the members failed to keep agreements regarding prices.

Many similar sad experiences brought about a change in the conduct of most trade organizations. American business men very quickly recognize that great advantage and benefit could accrue to them through constructive cooperation with their competitors, along many different lines. Trade associations with legal and laudable purposes gradually increased in number, although the movement was somewhat retarded by the passage of the Sherman Act, which cast for a time the shadow of doubt over associative activities.

The final result of this gradual evolution of the cooperative spirit within the American business fraternity was the open-price association which originated in 1911. By this time the industrial development of the United States had reached the stage of maturity; no new and startling discoveries of natural resources could be expected. Population had ceased to grow by leaps and bounds. The leaders of industry were faced with a narrowing market and with the task of stabilizing business. It was evident that the tortuous path of business cycles could not be left to individual action. That in most industries some form of cooperation was indispensable, became apparent.

The open-price association was developed to supply this need. The underlying idea of the open-price plan, as conducted by the modern American trade institute, is to make possible, through voluntary intensive cooperation among competitors, the interchange of business information such as amount of production, size of inventories, prices at which sales have actually been made, etc., etc., so as to enable each producer independently to determine his production and price policies in the interest, not only of his own enterprise, but also of the industry as a whole.

Whereas, formerly, a producer only feared the competition of those in his own industrial group, he now finds that he must work constructively with his competitors to combat the menace of rival groups which entice the dollar which would normally be his. For example, the wood manufacturer must now contest with the brick, cement, steel and similar fabricators. The means usually employed to achieve this end is cooperative advertising. This is surely one of the most important of all possible activities of a trade organization. Many producers in various lines, although very progressive business men, are too small individually to carry the story of their product and industry to the buying public. They can accomplish this in a more efficient manner by contributing their share toward the expense of a joint advertising campaign.

Of Long Standing Origin

Both cartels and trade associations have their origin in antiquity. Associations of similar character and having the same purposes can be traced from Biblical times. The Roman collegia and medieval guilds are undoubtedly the ancestors of the present day cartel, which is simply a trade association composed of independent units of a specific industry organized for the purpose of controlling the market or markets for the output of said industry.

The methods employed in Germany to achieve the desired end are sometimes restricted, sometimes far-reaching.

The validity of agreements among individual producers or associations of producers in Germany to fix prices, control output, allocate territories, and in other ways to interfere with the operation of the competitive system was generally upheld by the courts, only the gravest abuses being subject to punishment under certain sections of the Penal Code and, after 1909, under the Civil Code, which prohibited, in a general paragraph, acts repugnant to good morals.

Up to the outbreak of the World War, the German Government, (except in the case of the potash indus-

try which was always a semi-public monopoly) remained a neutral observer, allowing the captains of industry to fight ruthlessly or to cooperate free from interference by the public authorities. As a matter of fact, the Imperial Government not only put no obstacles in the way of cartels, but even regarded them as a necessary part of the national industrial organization, particularly in connection with the conquest of foreign markets. Accordingly the modern cartel flourished in Germany and gradually spread to the other industrial countries of Europe.

The present cartel movement seems to have originated in Germany during or shortly after the panic of 1873. Similar to the trade association movement in America growth at first was slow. It was not until 1895 that cartels began to multiply at a rapid rate.

Economic and political authorities have written wells of ink dry arguing the causes of the expansion of cartels—some attributing it to the German protective tariff act of 1879; others to the natural desire of business men to regulate competition and production in times of stress. Undoubtedly the absence of restrictive laws, and a favorable governmental attitude, encouraged this development, as the human factor is after all the predominating one in economic life, and business men learned long, long ago, that in union there is strength and profits.

Cartels Objectives

Whatever the causes of this growth or the motives of its promoters, there is no doubt that the cartel rapidly became the most powerful factor in the economic life of Germany and of the continent of Europe. Cartels assumed a variety of forms according to the type of industry and the character of competition. Those who see only a cure for unemployment and increase in purchasing power in our Industrial Recovery Law might note that in general, it is possible to distinguish six different cartels objectives: regulating prices, limiting output, allocating contracts, pooling profits, selling syndicates, and dividing sales territories. Some cartels combine two or more of these activities, some all of them. For example, the German Coal Cartel fixes the output of its members, sets the price, and sells their total production through a central selling agency.

It was not in Germany that those industries that are the largest employers of labor were the first cartelized, but those industries producing raw materials, like coal, potash and iron, or those which require large amounts of fixed capital and which produce a mass of standardized commodities because they suffered most from over-production and cut-throat competition. They could also more easily control production and prices than industries with limited capital, producing material which varied greatly in quality, and in which any increase in prices, brought about by a cartel, would inevitably attract new producers into the field. However, the organization of cartels in the basic raw material industries and the strength they demonstrated, made it necessary for the industries manufacturing semi-finished or finished products to form organizations of their own to defend themselves against the monopolistic tendencies of the producers of raw materials. Thus, for example, in the iron and steel industry we have the Pig Iron Cartel, the Steel Works Cartel, the "A" Products Cartel, the Bar Iron Cartel, the Band Iron Cartel, the Thick Sheet Cartel, the Wire Cable Cartel, the Conducting Wire Cartel, the Fittings Cartel, and according to one estimate, more than two hundred other cartels. Further complications are added by the existence of large vertical combines, like the United Steel Works Corporation (Vereinigte Stahlwerke A.G.) which produces its own coal, raw materials, semi-finished products and a large variety of finished materials. Some of these combines belong to numerous cartels (the United Steel Works to more than twelve) and naturally exercise a great influence on the policies and administration of the cartels of which they are members. Here apparently lies the answer to our present pressing problem as to whether a few basic codes for big industries will suffice. Practically, according to German experience, they will not.

The World War found German industries in a state of almost complete cartelization. Forced by necessity to mobilize all the economic and social forces of the country with one aim in view—to try to win the war—the Government saw in the cartels a marvelous instrument for the exercise of state control over industrial operations, and gave up its neutrality and assumed dictatorial powers. The renewal of the Coal Cartel in 1915 would not have taken place without the interference of the Government.

Compulsory Cartels

The development of cartels, during the war, under the pressure of the Government took place under circumstances which bore no resemblance to the prewar structure of German economic life, but which is startlingly like the "emergency" Congress has declared, so it is very well to emphasize one important fact brought out during the war: the Government with great ease took over the management of industry by making the cartel form of organization compulsory and by directing the policies of the cartels. The implications are plain and far reaching. The way to complete socialism or national syndicalism is pointed out. The position of one of Germany's great political parties distinctly implies future fundamental political and economic changes. The Social Democratic Party formerly opposed cartels. It seems that they have realized that state socialism cannot be put into actual practice in a few days, but must be done gradually over a long period of time. Their new cartel policy, as

expressed by some of their leaders, involves a governmental monopoly office with broad powers over cartels together with representation of the workers in the management of each and every cartel. They apparently vision a day when the Government will again step in, as it did during the War, and take complete and lasting control over the entire industrial life of the nation.

After the war, an attempt was actually made in Germany to place all economic activity under the supervision of the Government, and the so-called socialization laws were passed, which partially accomplished this. The law regulating the coal industry created a Federal Coal Council. The law regulating the potash industry modified the Law of 1910 giving greater control by the State and increasing the share of labor in the management. The law socializing the electrical industry was passed.

Effect of Price Fluctuations on Cartels

Such compulsory cartels strike a staggering blow at free competition. They restrict individual initiative and freedom of action. They mix politics and economics and subordinate the interests of an industry, not to the interests of the community as a whole, but to what in the opinion of a limited group of men seems to be in the public interest. The wisdom of such a group is, of course, not infallible, and men best qualified to pass judgment on intricate questions of business policy, and who are free from political influence, will not always make these decisions. Of the sixty members of the Federal Coal Council, more than half are representatives of labor, consumers and technical experts nominated by the Government. Besides the Minister of Economic Affairs has the power of veto in matters pertaining to prices and producton.

Inflationists in this country, should note that during the period of German inflation from 1919 to 1924, the extreme price fluctuations eliminated the necessity for the maintenance of cartels. Demand greatly exceeded supply. Therefore there was no need of adjusting production to consumption, of controlling output or fixing prices—adherence to a cartel ceased to be an advantage. So many Cartels went out of existence at this time that it is known as the Cartel death period. It certainly looks as if a buyers' market is to a great extent responsiblefor the value of and necessity for cartels, or other monopolistic institutions.

The only cartels that had a practical value, during that chaotic time, were those that confined their activities to regulating the conditions of sale so as to shift the entire risk of inflation to the buyer. These condition cartels grew rapidly in number and through their evident abuse of economic power—the scarcity of goods left the buyers no alternative but to accept the sellers' terms—they became exceedingly unpopular with the mass of consumers, who felt that they had to stand all the burdens and consequences of the sky-rocket monetary fluctuations. Accordingly the demand for cartel regulation, which was always present even long before the war, could no longer be denied. The Government would not follow the wishes of the Reichstag. It felt, in the first place, that the cartels were no more dangerous to the public interests than the tremendous vertical combines which were so popular during the period of inflation. In the second place, it did not find it necessary or desirable to allow consumers to interfere with the operation of productive industry, although it did not apply this same principle to the compulsory cartels.

However a new law was enacted in 1922, usually known as the Cartel Law, which does not prohibit agreements in restraint of trade, but provides that all such agreements are void unless executed in writing, in which case they permit an appeal to the Cartel Court, which this law established, when they try to defeat the purpose of the cartel law, and when they endanger the common welfare or business as a whole. In the latter case they can be annulled by the Cartel Court upon application of the Minister of Economic Affairs. The agreements can also be cancelled by the contracting parties without prior notice, if the Minister of Economic Affairs gives his consent. Cartel agreements cannot become effective without the permission of the Minister. Furthermore, this law provides that drastic steps against competitors cannot be employed without the assent of the presiding judge of the Cartel Court, who is an appointee of the President of the Republic.

Authority Vested in Industrial Administrator

The authority of our new Industrial Administrator is very like the power reposed in the hands of the Minister of Economic Affairs, who of course, represents in Germany a political party and whose views have been always colored to some extent by the platform of his political group. He is vested not only with the power of appeal to the Cartel Court, but also with the power of direct action if he finds it necessary to interfere in the interest of the public welfare. The absence of any criterion as to what constitutes an abuse of economic power endangering the common welfare or business as a whole places the business community in a state of uncertainty and leaves the door open for political action of a kind which the framers of the Cartel Law perhaps never intended. All these powers were grasped by the German State at a time of extreme economic maladjustment and tremendous political difficulties, during what our Congress deems an "emergency"; and while there are indications that the law may be revised, and although some German industrialists feel that in actual practice they operate without perceptible interference, the fact remains that Germany has through the medium of cartels come perilously near the line that separates private enterprise from state socialism.

But most interesting of all to us today is the fate of the cartels during the depression period. As during

the inflation period, times of economic stress have proved disastrous to voluntary agreements among the firms in a given field. The first cartels to break up were those dealing with consumer goods. It was impossible to maintain the cartel agreement, especially those clauses which enter into the costs of goods, such as labor and hours, and also those clauses agreeing not to sell below a predetermined cost price. Following the break up of the consumer goods cartels came those among the producers of raw materials and commodities. At the present time there are only three of all the great European cartels which are still functioning—the Potash, the Dyestuff, and the Mercury Cartels.

Success of Some Chemical Cartels

To those of us in the chemical industry it is perhaps of more than passing interest that these are all of a chemical nature, and we can appreciate very quickly the particular advantages which these three associations have held. Behind the potash group has been the united strength of the German and French governments. The Mercury Cartel has consisted essentially of two producers, Spain and Italy, who have been almost without effective competition. The Dyestuffs group is also small in number, but probably more important in its preservation, has been the fact that this is a business controlled largely by patents and secret processes, which make it extremely difficult for newcomers to break into the field. Against the success of these chemical cartels, we have seen the rather disastrous experience of the nitrogen producers, the cartels for the various metals, for rayon, and for a considerable number of other chemical process producers.

In Germany the failure of the cartels during both inflation and deflation, has been charged to the Government's failure to enforce the Cartel Law. When prices rise quickly or fall precipitately, it is no longer an advantage to maintain the restrictive clauses of the agreement, and members of the cartels have broken away. The government has failed to bring them into court to enforce the agreement, and this failure has been due to the very human fact that it is almost impossible for an elective form of government to indict a large and influential group of citizens.

By analogy it would appear that enforcement is going to be one of the very serious problems of our Industrial Recovery Act. General Johnson cannot escape this question by telling the industries to police themselves. It is contrary to human nature for an industry to act simultaneously both as detective and judge against its own competitors. If we embark upon a serious program of inflation, or if the depressing effects of bad business continue, we may reasonably expect enforcement to become as prominent a problem in industrial recovery as it was in national prohibition.

Continuous Hydrogenation Process

By C. H. S. Tupholme

THE continuous process of oil hydrogenation developed lately appears to offer advantages over the earlier methods, since the regeneration and efficiency of the stationary catalyst are technically satisfactory. This process is developed by Bolton and Lush.

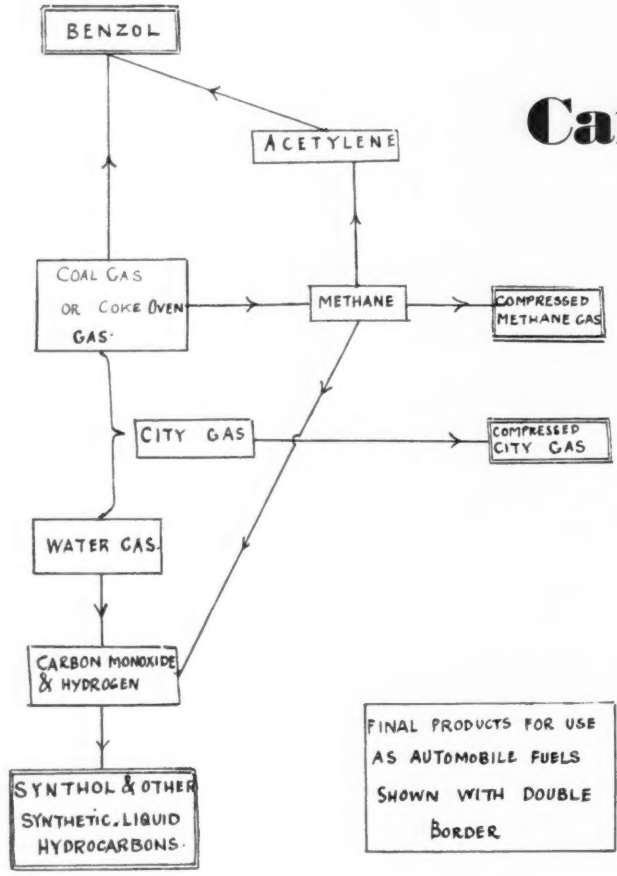
The catalyst used is in compact form and consists of a mass of oxidized nickel turnings, wool or wire, in an openwork nickel frame. The surface of the nickel is rendered catalytic, either as the anode in a dilute solution of sodium carbonate electrolyzed at suitable current density, or by steeping it in a bath of dilute sodium hypochlorite. The metal receives, by either process, a superficial coating of an adherent film of oxide which yields an active catalyst when, after washing and drying, it is exposed to the action of hydrogen at about 250 deg. C.

A stream of oil and hydrogen is passed over the catalyst contained in a number of tubes in series, and the hydrogenated oil thus produced leaves the plant in a clear and bright condition, requiring no filtration. The time of contact with the nickel catalyst is only a very few minutes—an advantage over the "powder" process in which the contact is considerably prolonged. Control is simple and any desired degree of hydrogenation of the oil can be obtained by adjusting the rate of flow.

A unit hardening only five tons of oil a week will pay, but the process is in commercial operation in much larger units than this, standard units of 100 tons per week being in use, and multiples of these are manageable at a low increase of overhead charges. The advantages claimed for this process are:

1. Continuous operation.
2. The hydrogenated oil needs no filtration.
3. The catalyst, regarded as part of the plant, can be revivified, by anodic oxidation and subsequent reduction, for years without any appreciable loss.
4. Control of composition of the hydrogenated product (selection).
5. Output inversely proportional to the extent of hydrogenation.
6. No "splitting" of the oil, with formation of free fatty acids; consequently, subsequent neutralization by alkali is not necessary.
7. The oil is heated for about 10-15 minutes only during the operation of hydrogenation.
8. Low cost of operation.

An average figure for hydrogen consumption in a fat-hardening installation is about one per cent. by weight of the oil treated, or about 3,000 cu. ft. per ton, but the actual amount of hydrogen with which different fats combine is, of course, dependent on their original state of saturation and on whether they are to be converted into hard tallow-like fat, soft fat, or semi-liquid fatty oils.



Carbonization Gases for Fuels

A Review of Recent European Developments by

R. C. Bickmore

In Europe at the present time automobile fuels are being supplemented by the use of compressed city gas, or compressed gases isolated from coal gas or coke oven gas, and by synthetic liquid hydrocarbons derived from these gases by catalysis. While their use as motor fuel in petroleum blessed America is unlikely, some of the recent developments hold distinct possibilities for the by-product production of fuel for stationary gas engines in chemical plants. L. Delagarde[1] states that the Paris Gas Company, by adapting the chassis of Panhard buses to take four cylinders of compressed city gas, (sufficient for one day's run of 87 miles with a load of five tons, each cylinder containing 35 cu. ft. of gas under 195 atmospheres pressure) can effect a saving in fuel costs of ½ to 2c. per mile. One gallon of gasoline is equivalent to 26-29 cu. ft. of 470 B.Th.U. gas. The small loss of power due to the use of gas can be overcome by increasing the compression of the engine.

Developments along this line are taking place in England, where compressed coal gases are being used especially for heavy vehicles, buses, etc.

Where a large quantity of coke oven gas is used to supply hydrogen necessary for ammonia synthesis, as in Germany, there remains much methane as by-product. This, as Herr Klinkhart mentions in "Das Gas and Wasserfach"[2] is a potential source of motor fuel, especially suitable for heavy vehicles, such as omnibuses, to which it is supplied in steel cylinders containing 40 litres (1.3 cu. ft.) of methane at 150 atmospheres pressure (2,200 lb. per sq. in.) equivalent to 6 cu. m. (212 cu. ft.) at ordinary atmospheric pressure.

The Brown-Concordia-Linde ammonia process of the Ruhr-Chemie, Oberhausen-Holten, Germany, is able to recover annually 200,000 cu. m. (7.06 million cu. ft.) of methane as a by-product, one cu. m. of which is equivalent to 1 kg. of motor benzol. (1,000 cu. ft. = 7.1 gal. of benzol of 0.88 sp. gr.). The Concordia Colliery Co. by over ten years' practical tests has proved a saving of at least 50% on fuel costs as against benzol even under present conditions. This figure would be much reduced by a more general use of methane by motor vehicles. Klinkhart describes in detail, in the paper mentioned, the equipment of the vehicles together with the results obtained.

Synthetic Liquid Hydrocarbons—Synthol

Manufactured water gas, suitably pre-treated coal gas, coke oven gas, or water gas made from the solid carbonaceous residue from the coal distillation are used for the production of liquid motor fuels by such syntheses as Franz Fischer and Hans Tropsch's "Synthol" method, in operation at Mulheim, or the Badische process. Both methods involve the production of carbon monoxide and hydrogen and combination of these to form liquids. (For methods see Prof. Fischer's "Die Umwandlung der Kohle in Ole").

The original conditions of the Fischer Synthesis were:—Catalyst—mixture of iron borings and potassium carbonate. Temperature—410° C. Pressure—100-150 atmospheres. The synthol obtained from the water gas reaction in a tinned iron tube and under the conditions mentioned consists substantially of light oils, with smaller quantities of alcohols, aldehydes, ketones, oily substances miscible with water, and organic acids. It has a distillation range 72°-250° C.,

and on refining yields a product of:—Sp. Gr., 0.8289; Gross C.V., 14,800 B.Th.U./lb.; Net C.V., 13,600 B.Th.U./lb; Solidifying Point, 90° C.; Carbon, 69.26%; Hydrogen, 12.25%; Distillation range 62°-200° C., giving 84% by weight to 160° C.

Practical Running Tests on Synthol

Practically the whole of the Synthol (over 80%) can be used for motor spirit.

Kilometres run per 100 cc. Synthol = 3.0
" " " " " Benzol = 2.9
" " " 50-50 " Synthol-Benzol = 3.2
(Sp. Gr. of benzol used = 0.8790
C.V. of benzol used = 17,250 net/lb.)

Further treatment of the higher boiling point fractions by high pressure and temperatures in bombs and autoclaves yields a range of different products. By recirculating the reaction gases, Fischer and Tropsch found that they could obtain 112 ccs. (100 gms.) of liquid oil products per cubic metre of water gas. Reckoning a water gas production of 56,000 cu. ft. per ton of solid carbonaceous residue, which is a moderate volume readily obtained in modern practice, 0.160 tons or 40 gallons of motor spirit, with slight refining losses, are available for direct use. Both the "Synthol" and the Badische methods start from the same raw material (water gas from coal residue) and the latter process is working on a large scale.

Technical improvements have resulted in increased yield of light oil, and normal pressures[3] are used for the synthesis, the catalysts used being cobalt—copper, and manganese-iron-copper. Later reports state that the cheapest gaseous mixture has been found to be one of coke oven and blast furnace gases [4, 5].

By combining these methods with such process as the "L & N" at least 60-80 gallons of oils of greatest utility can be produced per ton of average low-grade British bituminous small coal. Of this oil, 20 gallons are primary distillation oils, and the balance is motor spirits from the solid fuel residue.

Benzol Spirit via Acetylene

$$\begin{array}{l} CH_4 \longrightarrow C_2H_2 \longrightarrow C_6H_6 \\ \uparrow \\ CO \end{array}$$

The methane of coal gas or coke oven gas can be separated by any of the numerous known means[6] and the methane, together with the methane derived catalytically from the carbon monoxide[7] can be converted into acetylene [8, 9]. The I.G. use a high tension electric discharge at 15-20 m.m. pressure. The acetylene produced in this way may be converted into liquid hydrocarbons by passage over active charcoal or Silica gel at 600°-700° [10]. The carbon deposited upon the contact material then acts as a condensation catalyst, giving increasing amounts of liquid products up to a conversion of 70% of the acetylene. The light oil to 150° C. contains 70% aromatic and 30% unsaturated hydrocarbons, but no paraffins. By heating acetylene—hydrogen mixtures in presence of metallic catalysts at 250° C., F. Fischer, K. Peters and H. Koch have converted 40-70% of the acetylene into oil [11].

Mixtures of acetylene and carbon dioxide favor the formation of light oil. By subjecting one cu. m. of coke oven gas to an electrical discharge and then to the latter process, 85 gms. of oil were obtained, of which 75% existed as light oil. K. Peters and K. Meyer[12] give curves showing conditions necessary for production of carbon, benzol or acetylene from methane, coke oven gas, and from coal gas. F. Fischer and K. Peters[13] describe the formation of hydrocarbons from water gas by electric discharge.

When treating gases containing methane to high-tension discharge at 15-50 m.m. pressure, as mentioned previously, it was found that a diluted gas, such as coke oven gas (23.4% CH_4, 52.3% H_2) gave the best results, the exit gases containing 9.2% of acetylene.

Industrial Applications

As an industrial application of the conversion of methane into first ethylene and acetylene and then into benzene may be quoted the I.G. patents[14] whereby gases containing methane are passed under pressure over a metallic salt or oxide catalyst, or over an active carbon or Silica gel catalyst at 700°-1000° C. whereby ethylene and acetylene are produced. By limiting the speed of reaction, the products are benzene, naphthalene and acetylene. Alternatively the I. G. has a direct process[15] for the conversion of gases containing hydrogen and carbon monoxide catalytically into methane and hence into acetylene and benzene.

Using methane itself, the I. G. found[16] that this gas is converted into petroleum-like hydrocarbons by passing at 500°-900° under 1,000 atmospheres pressure over nickel, copper, cobalt, etc.; together with alkali or alkaline earth metals or salts, halogens or sulfur, the conversion being accelerated by the action of an electric field.

In England, the I. C. I. and Humphrey, in preparing hydrogen for synthetic ammonia in three stages, using a gas containing methane, evolved a process[17] for first treating the gas with steam at a high temperature to convert the methane into hydrogen and carbon monoxide. The mixture of these two gases was treated either by passage over a catalyst favoring the production of higher hydrocarbons, or the original gas mixture or residue from the first stage may be compressed, and after removal of any methane, passed over a catalyst favoring production of methanol. The remaining step consists of oxidizing the carbon monoxide from the original gas mixture or the single or

combined residue from the first and second stages with steam for the formation simultaneously of hydrogen for the ammonia synthesis.

The important parts of this patent from the point of view of motor fuels are, however, those dealing with the production of higher hydrocarbons and the production of methanol.

Ethylene into Benzene

Ethylene and its homologues can be converted into aromatic hydrocarbons suitable as motor fuels, but where carbonization gases are concerned the conversion would be commercially inapplicable to coke oven or coal gases as these do not contain more than about 3.0% by volume of ethylene. However, water gas, mixed with olefinic gases, when passed at atmospheric pressure over finely reduced iron at 550-°800° C., yields gases containing large quantities of aromatic hydrocarbons, which can be condensed and washed out of the gas.[18]

In the past, methods for increasing the light-oil yield from the carbonization of coal processes depended on the efficacy—often doubtful—of added ingredients to the coal. For example, the addition of lime was supposed to improve the yield of toluene in the light spirit. All such remedies have long since been abandoned. In recent years, some attempts have been made to introduce hydrogen into the gas generated in a retort subjected to an electro-magnetic field, whereby the carbon and hydrogen unite, the reaction tending to produce a gas of higher aromatic content.

Such a process is to be found in the proceeding of I. W. Henry.[19] Powdered bituminous coal is heated in order to generate gas in a retort subjected to a high-frequency, oscillating, electro-magnetic field. The carbon particles which are suspended in the gas are ionized and are caused to react with hydrogen brought from an external source, yielding an enriched gas.

Considerations, largely economic, enter into the problem of which conditions are commercially most favorable for the production of the motor fuels mentioned in this article.

Many gas and coke oven works already employing high pressures will find it advantageous to adapt their heavy motor vehicles to the use of compressed city gas or coal gas. These conditions prevail, for example, in Switzerland, where the gases are already subjected to high pressure for distribution.

Where coal gas or coke oven gas is used for obtaining hydrogen for ammonia synthesis, the residual gases remaining after separating the hydrogen from the other gas fractions, and formerly sent out to be used as fuel, have been turned to good account, especially the methane, as in German installations.

Hydrocarbon syntheses would appear to be best carried out at plants where a complete utilization of the fuel takes place, i. e. a carbonization process itself yielding a high proportion of oils suitable as motor spirit, such as the "L & N" process, and then a treatment of the carbonaceous residue from the coal distillation to yield the water gas for manufacture of the synthetic motor fuel by combination of the carbon monoxide and hydrogen over a catalyst. In this way, the largest volume of suitable oils will be produced on the most economical lines.

Alternatively, the synthesis can be carried out with water gas, as practised by the Societe Franco-Belge d' Ougree at Bully-les-Mines (France) for methanol. Coke oven gas is also used in some cases, but here it is necessary to convert the methane by oxidation into carbon monoxide and hydrogen. The Societe Courrieres-Kuhlmann uses coke oven gas to give, after adjustment of the hydrogen in the converted gas with water gas, a mixture of 33% CO and 66% H_2. The Societe d' Ougree Marihaye, manufacturing successively methanol and ammonia, also employs purified coke oven gas. The choice of using water gas or cracked coke oven gas for manufacturing synthetic motor fuels obviously depends, then, upon local facilities, the availability of coke and gas supplies, and whether synthetic ammonia production is to be carried on.

The greater part of the synthetic methanol (probably about 70%) is made from water gas, and of the total number of plants manufacturing synthetic ammonia from coke oven gas, about 12% of these plants make synthetic methanol. At the moment, on the Continent, the price of methanol compares favorably, at the large plants, with pump gasoline. With regard to the conversion of methane into acetylene and benzene, industrial activities are chiefly due to the I. G. in Germany and the I. C. I. in England. The future of the processes would seem to lie in the further application of the principle of high tension discharge to gases rich in methane or other mixtures containing converted methane.

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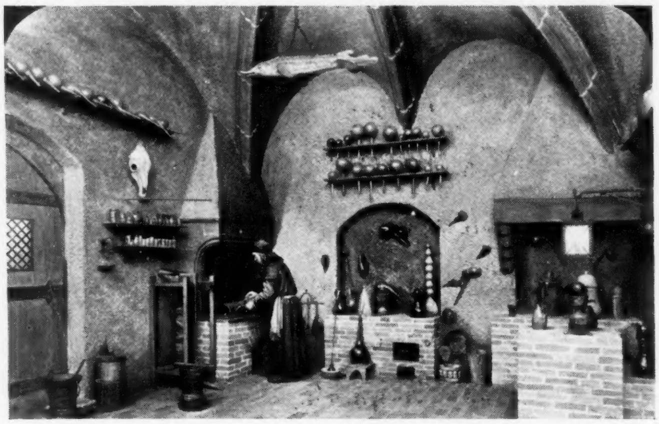
Fauser Synthetic Ammonia Process

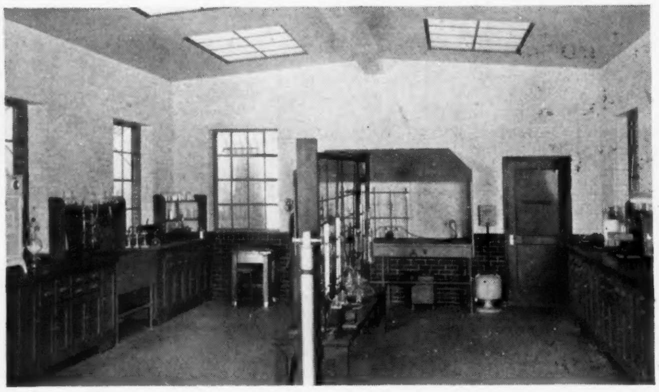
Total capacity of world plants for production of synthetic ammonia by the Fauser process is now about 1,000 tons of ammonia daily, while the daily capacity of the nitric acid plants using the Fauser processes is over 800 tons. The Fauser process for direct production of dry ammonia salts, particularly ammonium sulfate and ammonium nitrate without the use of centrifugal apparatus and driers, is being exploited industrially in Italy, the Netherlands, Belgium, and Poland.

CHEMICAL

The Photographic Record

The famous salt miners of Halle, Central Germany, called Halloren, celebrating their traditional "Whitsunday-Beer Festival", at which the "Halloren Bride" serves beer in a silver cup to the oldest Hallor.





Contrasting the old with the new in four centuries of progress by the chemical industry. Above, an alchemical laboratory of the 16th century. Left, a modern chemical laboratory, both photographs depicting Merck & Co.'s contribution to the Basic Science Exhibit at the Century of Progress.

Holding sway at the Exhibit, visualizing what may be expected of another century of progress, is the House of Tomorrow, of complete plastic design; the living room of which has its walls, ceilings and floors done in plastic brushing lacquer.

NEWS REEL

of Our Chemical Activities

Visitors to the Hall of Science at the Exposition will see this large model in three dimensions portraying the industrial plants and activities of Union Carbide & Carbon Corp. The model is animated and skillfully lighted to show scenes of both day and night effectively.

Victor Chemical Works have chosen to exhibit the section of their plant on which is located their blast furnace (probably the largest phosphoric acid producing unit in existence) for the manufacture of phosphoric acid. The mural in the background is a composite picture of their Nashville and Chicago Heights plants, and is compared with the original plant at Chicago Heights, built in 1897.

The Great Hall of the Hall of Science is another gratifying contribution of modern science and technique, its structure offering much food for thought and future possibilities. Illustration shows the result obtained by the use of illumination at grazing incidence upon lustreless casein paints.

"Rayon Oils"

Properties, Markets and Uses of Lubricants and Softeners on Synthetic Yarns

By Chas. E. Mullin, D. Sc.

ONLY a few years ago, practically everyone anyway connected with synthetic yarns was much concerned with the so-called "rayon" oils. Naturally so, for many products used to soften and lubricate the yarn were unsatisfactory and caused much trouble in dyeing, printing, and finishing. These oils have been so improved in recent years that the average yarn consumer encounters no difficulty and the interest in them is now among the researchers and sales managers of the oil and chemical companies producing them, and the purchasing agents of the synthetic yarn manufacturers.

However, many new wetting, dispersing, and emulsifying agents have been developed and are now being offered commercially, and it appears quite possible to improve even further and lower the cost of at least some of the products now in use.

On the basis of a synthetic yarn consumption of some 130,000,000 pounds (1932) it is possible that the consumption of special oils, soaps, etc., for use only in softening and lubricating, or improving these yarns may have totaled more than 10,000,000 pounds. It is hardly probable that any one of these will be best for every type of yarn in every stage of its manufacture and use. Yet many oil producers are trying to sell one product for every purpose on all types of yarns and most purchasing agents do not have time to become specialists in every product they are called upon to supply.

"Rayon oils" are widely used in the manufacture and processing of the synthetic yarns, as well as on the finished knit-goods and some woven fabrics. On the basis of the methods of application, there are two major groups: (*A*) applied "dry" or "straight," without dilution; (*B*) applied as an aqueous emulsion or dispersion. Oils of both types serve the same general purposes in the yarn, i.e., to (*a*) soften and (*b*) lubricate the completed yarn, (*c*) render it less hygroscopic during the knitting or weaving, and (*d*) cause the individual filaments of the threads to cohere and lay more closely together. It also serves other purposes, as will be discussed later, but these are its major functions.

As manufactured, most synthetic yarn is so wiry that in unwinding from cone or bobbin, the thread tends to come off in loops. In weaving or knitting these loops are caught in the shuttle, needles, and thread guides, tangling and causing breaks in the thread, stoppage of the machinery, and imperfections in the goods. Different types of yarns vary as to wiriness, the yarns containing the largest number of filaments per denier generally being the softer, but all must be oiled before weaving or knitting. In weaving, this softening of the filling (weft) yarn allows it to conform to the structure of the warp threads in the fabric structure, instead of laying more or less straight, like a wire, and results in a more closely woven fabric of better appearance. In knitting it permits smaller loops which lay closer together and give a much heavier and more closely knit fabric, also prevents breakage at the needles due to the sudden jerking of the thread into a short loop around the knitting needle. It also considerably alters the "handle" of the woven or knit goods, giving them more the feel of real silk. Certain acetate silk is naturally much softer than yarns of the other types, and rayon (viscose) is generally the most wiry.

Some unoiled rayon is so harsh that it soon cuts away the material of the thread guides, needles, shuttles, etc., used in winding, knitting, weaving, etc. As these become worn and roughened, they cause breakage of the filaments, giving it a hairy appearance (often called "lousiness"), as well as breakage of the thread itself. Absence of knots and imperfections are essential in high speed operation and the production of first grade textiles. The increased friction of unoiled yarns passing through a high speed knitting machine may be sufficient to cause a permanent stretch or even breakage of the yarn. Oil in the yarn lubricates its passage through guides and over machine parts, thereby reducing wear and avoiding broken filaments.

Most weaving is done in rooms with a high relative

humidity. Viscose, cuprammonium, and nitrate process yarns, collectively known as the regenerated cellulose yarns, are more hygroscopic than other ordinary textile materials. This high humidity in the weave room is desirable for cotton, wool, etc., since it tends to soften the yarns, largely eliminates static electricity, etc. In the same way it also softens synthetic yarns and, while this added softness may be desirable during weaving or knitting, these yarns lose strength rapidly as the amount of moisture present increases. This loss of strength is a serious matter in winding, weaving or knitting, in that the yarns are under strain during the above operations and, if the elastic limit is exceeded, they stretch permanently. As the stretched yarn is thinner than originally, it results in thin places in the completed goods. Stretched yarns do not dye as heavy a color as the original goods, which accentuates the uneven appearance of the fabric. Also, stretched yarns have a higher luster and cause the "shiners" so widely recognized as a defect in woven goods. Oiling decreases the hygroscopicity of the yarn so that humidity in the weaving or knitting plant will not cause undue weakness in the yarn.

Synthetic yarns are composed of many filaments or much finer single threads, usually twisted together. For example, the ordinary 150 denier viscose rayon thread is composed of from 24 to 60 individual filaments. "Multifilament" yarn of the same size may contain as many as 115 filaments or even more. In winding, knitting, weaving, etc., where the yarns are subject to friction, these individual filaments often become charged with static electricity. This is especially liable to happen in cold, dry weather, when the humidity of the heated factory may be low. As the filaments all carry the same static charge, they tend to repel each other and, when the yarn is loosely twisted, may cause some to stand out from the thread in small loops, which catch on the machine parts, breaking the thread or causing the lousiness mentioned above. The broken ends of the filaments are sure to stand out and cause further damage by catching in the machinery, needles, etc. Oiling decreases the tendency of the yarn and filaments to pick up the static charge, by reducing friction, and causes the individual filaments to adhere more closely together, by the slight stickiness of the oil film on all filaments.

Changes in Conditions

At one time practically all regenerated cellulose yarns were sold unoiled in skein form. This does not mean that they were entirely oil-free, but that more oil had to be added at some stage before the yarn was woven or knit, in order to obtain the best results. It has long been common practice to soften the yarn to some extent in the final operation of the finishing process, just before drying. This initial softening is obtained by treating the still-wet yarn with a strong solution of a suitable soap, a fairly strong solution of a suitable soluble oil, or a special aqueous emulsion of a suitable rayon oil. Oils of the *B* type referred to previously are used for this purpose.

Gradually the yarn manufacturers were forced to add all oil necessary for the final use of the yarn, as well as winding it onto the packages, (bobbins, pirns, cops, cones, etc.) used by the textile manufacturers. This was due to the use of unsuitable oils and bad oiling methods by synthetic yarn consumers in the knitting and weaving industries. Acetate silk was probably the first regularly sold in the softened condition. This was partly due to the softer nature of this acetate yarn, as manufactured, so that it is not generally necessary to add as much oil as to those of harsher nature.

How They Are Applied

Some of the knitters and weavers (*I*) simply opened an end of the yarn package and poured some oil over the yarn, depending entirely upon the capillarity of the yarn to distribute it evenly throughout. Sometimes the skeins were placed in piles and the oil poured over them. Often the amount of oil added was not accurately measured but the oiled yarn was generally allowed to stand for some time in a warm place, and then that on top was used first. (*II*) Some mills spread the yarn skeins out on the top of a table or on a shallow enameled or metal pan and sprayed it with the oil. The excess oil was then allowed to drain off by tilting the pan or hanging up the skeins. (*III*) Where a hydroextractor was available, the skeins were sometimes dipped into the oil and then extracted. The above methods were used upon yarn in skein form, but sometimes yarn in package form was also oiled.

In the best equipped plants (*IV*) the oil was applied by means of a wick or roller during the twisting or winding of the yarn. Obviously, this method offers many advantages as to control of the amount of oil applied and evenness of its distribution. This method is now in almost universal use and the oiling mechanism is usually a permanent part of the winding mechanism. The amount of oil is controlled in various ways, such as the length of travel of the yarn over the oiling wick or roller, the depth of oil in the trough supplying the wick or roller, the speed of the yarn or roller, etc. The oils used in the above four general methods of application are all applied to the air-dry yarn, or even to yarn specially dried beyond this condition, and are therefore of the first (*A*) type previously referred to.

On the other hand, (*V*) it has long been the practice of most synthetic yarn manufacturers to give the yarn an initial softening treatment before it is dried for the first time. As previously explained, this is done by treating the yarn, either as skeins, on the spinning bobbins, or as spinning cakes, with a strong soap or soluble oil solution, or an aqueous oil emulsion of the second type (*B*) mentioned previously. This is the

oldest practice in the softening of the synthetic yarns and is still continued in practically all plants, no matter how much oil is to be added later in the twisting and/or winding.

Although most synthetic yarns in the American trade are now sold wound in packages, ready for knitting or weaving, there is still a demand for skein yarn to be dyed either in hank form or to be wound on special packages for dyeing. The oil present in this yarn must be removed before dyeing, in order to secure level colors, so that this skein yarn is generally only "soaped" as in method *V* above, with soap, soluble oil, or special emulsifiable rayon oil, of the second type (*B*). No further oil or softening is added, and only sufficient is used to give good results in the winding of the skeins, dyeing packages, etc. On account of the necessity of removing this oil completely before dyeing, unless it is of the soluble oil or soap type that will assist in the dyeing operation, it is necessary to use only oils that are readily removed by rinsing with warm or hot water, or by a very light scouring of the yarn, in skein or package form.

After the skein yarn is dyed, it must be again softened and lubricated, and this is also done in an aqueous bath, as in method *V*, after which it is dried without rinsing. Very often the soap, soluble oil, or emulsifiable oil (type *B*) is added to the final rinse water, so as to avoid a special bath and extra handling. Likewise, in finishing materials (fabrics, hosiery, and other knit goods) containing the synthetic yarns, it is usually necessary to add some softening material, to obtain the soft silk-like handle desired. Usually these are applied in the same way as above, in a special soap or emulsion bath, or they may be added to the sizing or other finishing materials. The *B* type of oil is also used here.

Varieties of Rayon Oils

Obviously, the oils applied by the different methods and at different stages are not all the same. To avoid excessive moisture in the yarn during winding, weaving, knitting, the yarn is not dried after oiling by methods *I*, *II*, *III*, and *IV*, the oils applied by these methods are of the *A* type applied without dilution with water or other solution. The oils applied by method *V* are, on the other hand, always applied from an aqueous solution or emulsion and are, therefore, of the type *B* or second type mentioned. There are also other differences among the rayon oils.

While viscose, cuprammonium, and nitrate yarns are all essentially the same in chemical composition, each has certain physical characteristics that differentiate it from all other types. Although there is only one manufacturer of nitrate yarn in America, there are two manufacturers of cuprammonium, and a good many manufacturers of viscose. In most cases the manufacturers offer more than one brand and none of these brands are identical. The oil best suited for any one brand may not be the best for all others. Acetate silk is a true ester of acetic acid and cellulose, not a regenerated cellulose, and bears the same relation to cellulose or regenerated cellulose that ethyl acetate bears to ethyl alcohol, or olive oil to glycerol. Here an entirely different type of oil is generally used. Also there are four American manufacturers of acetate yarns and each turns out more than one brand. We might call the special oils for acetate silk a third (*C*) group.

Acetate silk is usually dry-spun and as it is ready for use when spun, there are no wet finishing operations, so that it is generally oiled by method *IV*. On the other hand, in many cases an oil emulsion or soap solution is used instead of a dry oil of the *A* type. One reason is the high static charge often present on very dry acetate silk. At least a part of this oil emulsion is often applied to the untwisted yarn as it leaves the dry-spinning cell, by means of a wick or roller, as in method *IV*, in order to dispel the static charge on the filaments and thus avoid "ballooning" of the filaments as they leave the warm, dry atmosphere of the spinning cell. In this case the amount of moisture added is merely sufficient to assist in dispelling the static charge and is not sufficient to leave the yarn wet. The yarn is not dried after the oiling.

Softening acetate silk has been solved more or less satisfactorily by the various manufacturers. The ordinary type of rayon oil is not suitable, especially where the product is to be dyed subsequently. There are several reasons for this: Acetate yarn is thermoplastic and cannot be scoured at as high a temperature as yarns of the regenerated cellulose type. Some of these yarns are delustered by scouring at temperatures above about 85° C. (185° F.). As cellulose acetate is readily saponified by strongly alkaline solutions, it should not be scoured in as hot nor as alkaline a bath as is sometimes used for the other varieties of synthetic yarns. Further, many special acetate silk dyes are oil-soluble, the oil must be removed completely from the material before dyeing or the parts containing the oil will dye a heavier shade than the yarn free from oil. This is just the reverse of the case with the other types of synthetic yarns.

Amounts of Oil Used

The actual amount of oil present in any synthetic yarn varies with the variety of yarn, its size, the number of filaments, and whether it is to be used in the knitting or weaving trade, etc. Probably yarn for the weaving trade may contain, on an average, somewhat less than five per cent. of oil. That destined for knitting always contains considerably more and some knitters used to figure on as much as twelve per cent. Probably somewhat less than ten per cent. is now the general practice. In the same way, even the woven or knit goods are also generally finished up with a little softening oil or other material, but this oil is often less than one per cent., on the weight of the finished goods.

It is quite probable that the average amount of oil in yarns for both the weaving and knitting trade will

average about six per cent., or perhaps even more, which means a consumption of about 7,800,000 pounds of rayon oils, soluble oils, and soaps by the synthetic yarn manufacturers alone. Most of this is the *A* type, for application to the dry yarn, but a definite proportion is of the *B* type. It is possible that an additional 2,000,000 pounds, or perhaps a great deal more, oil of the *B* type, soluble oil, and special softeners for use in finishing synthetic yarn goods (knit and woven), are sold to the dyeing and finishing trade.

Obviously, the largest consumers of oils of the *A* type are the synthetic yarn manufacturers. They also almost always use some oil of the *B* type, or a soluble oil, special soap or sulfonated fat, for application by method *V*. Some *A* type oil is also used by the yarn winders and throwsters. While the amount of *A* type oil used is much larger than that of the *B* type, the number of consumers is much smaller, therefore these sales are much larger and this business more desirable. The sales of the *B* type oil are scattered through the synthetic manufacturing, dyeing, and finishing plants. Also, quite a number of the largest synthetic yarn manufacturers now blend their own oils, of both *A* and *B* types, but from purchased oils, soaps, sulfonated oils, and other emulsifying agents.

Oil Specifications

There is no one best rayon oil and the specification of an oil should vary with the type of yarn upon which it is to be used, the amount of oil to be used, the method of application, and the exact results desired. Of course it must fulfil the four major reasons for oiling the yarn, that is, soften and lubricate it, decrease its hygroscopicity, render it less wiry, and hold the filaments to the body of the yarn. In addition to this, it must penetrate well into the interior of the thread, so as to soften it throughout, and must not discolor the yarn or goods even upon long aging under any conditions encountered in practice. It must not oxidize on the yarn or become gummy with age, and most oils should rinse or scour out of the yarn or goods easily, so as not to cause trouble in the dyeing and finishing. It must have a high flash point, a low cold test, and be odorless and not develop an objectionable odor when allowed to remain indefinitely in the goods. Above all, it must not tender the goods under any condition. The blended oil should not have any tendency to settle or separate, either on long storage or while in use. Emulsions of the oil should be as stable as possible and, where standing baths are used, not subject to "creaming." Where the oil is used in finishing piece or knit goods, after dyeing, it should not ordinarily be readily washed out of the goods completely in laundering, otherwise the material may become too harsh, and the amount of oil or softener necessary to soften the goods must not be sufficient to cause stains or oil marks on other fabrics, paper wrappings, boxes, packages, etc.

The Industry's Bookshelf

Value Theory & Business Cycles, by H. L. McCracken, 270 p., published by Falcon Press, Inc., 330 W. 42 st., N. Y. City. $4.00.

This book presents a complete study of the economics of business cycles; discusses thoroughly the nature of the post war period; sets forth the causes for the violent shifts from prosperity to depression, and outlines necessary correctives. Finally it shows what must be accomplished before recovery can be started and what can be done to keep business steadier.

The Physiological Effects of Radiant Energy, 610 p., by Henry Laurens, published by the Chemical Catalog Co., 330 W. 42 st., N. Y. City. $6.00.

This book is one in the series of A. C. S. Monographs. It is indeed unnecessary to go into details in the members of this series, the source of the work guaranteeing the accuracy and authoritativeness of the data presented. A work that should be in the hands of all those connected with industrial safety work.

Practical Advertising, by Herbert Field King, 387 p., published by D. Appleton & Co., 35 W. 32 st., N. Y. City. $2.50.

An eminently practical book written by a practical agency man. Beginning with fundamentals it progresses by orderly and logical steps from the first things the advertiser and seller must know to a complete study of the manifold and varied ramifications of the subject, For the executive charged with supervising company advertising it is an invaluable book, unless he is, by chance, trained along those lines.

Industrial Chemistry, by William Thornton Read, 576 p., published by John Wiley & Sons, Inc., 440 4 ave., N. Y. City. $5.00.

One field of chemistry that has not been flooded with an oversupply of suitable textbooks is that of chemical engineering operations. For this reason this book written by the Dean of Chemistry at Rutgers (who in so many of his contacts outside fit him to write such a book) is a valuable contribution. It's simple purpose is to give an adequate and well-balanced picture of modern industries from the standpoint of chemical compounds and changes, chemical engineering operations, sources of raw materials, uses of products, and economic relationships. It is a book that can be read with benefit by a number of chemical executives not particularly technically trained. Of additional interest is the fact that it is bound with cloth impregnated with pyroxylin to withstand rough and continuous usage.

Evaporating, Condensing and Cooling Apparatus—Explanations, Formulae, and Tables for Use in Practice, by E. Hausbrand, fifth English edition revised and enlarged by Basil Heastie after original translation by A. C. Wright. 500 p., published by D. Van Nostrand Co., 250 4 ave., N. Y. City. $8.00.

Again no detailed review of this book is necessary. For one actually engaged in engineering practices covered, it is a book that is authoritative and invaluable as a reference and guide.

Quantitative Chemical Analysis, 3rd Edition, by George McPhail Smith, 199 p., published by The MacMillan Co., 60 5 ave., N. Y. City. $2.25.

Book is intended for use with classes consisting of students who have completed a substantial year's work in elementary chemistry and qualitative chemistry. It is sufficiently complete; it is concise, but eliminates non-essentials and should appeal strongly at the moment.

Differential Equations, by Max Morris and Orley E. Brown, 409 p., published by Prentice-Hall, Inc., 70 5 ave., N. Y. City. $2.50.

A textbook that will prove very popular because of the more than generous amount of exercises it contains in addition to several other admirable points that will appeal strongly to the teacher.

Chemical Treatment of Rubber Latex

By D. F. Twiss

SOMEWHAT surprisingly the reduction in the price of raw rubber of recent years has not been altogether favorable to the adoption of latex processes. A reason for this is that the small premium on the price of latex rubber for special handling and additional transport charges becomes a much greater percentage of the cost of raw rubber when the latter is near 2d. a lb. than when it is 2s. per lb. On the other hand however, the reduction in the cost of raw rubber has increased the advantages of latex for purposes which cannot well be served by ordinary rubber and where latex has to compete primarily with non-rubber materials. By concentrating latex on the plantations it has been possible substantially to reduce its bulk and weight and consequently the transport charges, and today the greater portion of the latex exported (nearly 10,000 tons of dry rubber in 1932) contains less than one-half its weight of water. The latex is transported mainly in steamer tanks (preferably wax-lined), in drums (of 40-65 gal. capacity), and in 4-gal. tins.

The main advantages of latex are as follows:

1. The rubber is available in a fluid condition without the cost and the ill-effects of mastication. The latex is easily used for purposes such as spreading or soaking; further it can be compounded without the need for heavy machinery involved in ordinary rubber manufacture.

2. Latex contains a much higher proportion of rubber than rubber solutions of equivalent viscosity. The proportion of volatile medium to be removed is therefore considerably less.

3. Not only is the cost of the rubber solvent eliminated, but the fire risk and health hazards of the common solvents are obviated.

4. Latex, by induced coagulation, readily yields solid rubber (admittedly wet) when required, whereas solutions normally have to be evaporated more or less completely. Articles can therefore be removed at an early stage from formers, molds, etc., permitting the rapid return of these to the cycle of operations.

5. On account of the avoidance of the development of heat which arises in the milling of raw rubber, it is possible to use freely the most powerful accelerators of vulcanization in latex-compounding without fear of trouble from scorching or premature vulcanization. The low temperature of eventual vulcanization permits the use of bright organic pigments which would be discolored in ordinary heat vulcanization.

6. The latex rubber products normally contain a full proportion of the natural anti-oxidant constituents of the latex and so, *ceteris paribus*, show better aging qualities in addition to the greater mechanical strength arising from the unworked condition of the rubber.

Features of latex constituting possible disadvantages are:

1. The need of a small proportion of some form of preservative or stabilizing agent, *e.g.*, 0.5% of ammonia or 1% of potassium hydroxide.

2. The need for removal of water at some stage of manufacture.

3. The lower stability relative to rubber solutions, for example, for storage. On the other hand this lower stability is a distinct advantage for some operations.

4. The incorporation of reinforcing agents to the full effect of the latter is at present more difficult than with dry rubber.

Modifications of Rubber Latex for Manufacturing Purposes

Compounding.—In view of the fact that rubber for commercial purposes is generally required in a vulcanized condition, it is customary to use latex more or less compounded. Compounding is easily effected by adding the materials after wetting or dispersion in water. Sulfur, accelerators, and the usual powders are easily incorporated in this way. It is important that they should at least be wetted before incorporation. It is further desirable that they should be made faintly alkaline preferably with a small quantity of ammonia. As a still further refinement they may be added in the form of colloidal, or almost colloidal suspensions, in which case a small quantity of a dispersing or stabilizing agent, such as casein, gum arabic, or gelatin, may be mixed with them. Colloid mills are of use in this connection, but mainly to ensure complete wetting of the powders and the effective disintegration of the agglomerates before addition to the latex. A ball mill can effectively aid the wet dispersion of powders for latex-compounding. Precipitable powders such as barium sulfate may even be formed in the latex itself using the latter as the precipitation medium. Oils, bitumens, etc. also are introduced in the form of colloidal dispersions, the production of which is generally assisted by a small percentage of ammonium soap and is facilitated by the use of a colloid mill. Some compounding ingredients which are otherwise difficult to disperse

satisfactorily, *e.g.*, certain anti-oxidants, can be dissolved in the oils before these are emulsified. Fatty acids, such as oleic acid or stearic acid, are desirably introduced in the form of their ammonium salts, the acid being eventually liberated by the substantial loss of ammonia during drying. By compounding before concentration, exceptionally uniform and permanent dispersion of compounding ingredients is possible. In the production of thin rubber goods it is possible to introduce rubber-soluble compounding ingredients, especially accelerators of vulcanization, by diffusion, *e.g.*, from an aqueous solution or dispersion into the unvulcanized article; this procedure of course is equally applicable to thin articles made from sheet rubber or rubber solutions. In the following discussion the term "latex" will frequently be used to include latex suitably compounded with vulcanizing agents, pigments, and other modifying ingredients.

Adjustment of Viscosity and Concentration

For many purposes, e. g., for spreading or dipping, natural latex although containing about 35% of rubber may be inconveniently fluid; it may for this reason permit sedimentation (or creaming) of compounding ingredients. To prevent this the viscosity can be increased by several methods, of which the following are typical:

1. The use of colloidal materials such as albumin, gum tragacanth, or even milk for this purpose protected by patent as long ago as 1855. It is possible that in the case of milk, in addition to the effect of casein, the thickening occurs to some extent by absorption of fat by the latex globules. The addition of rubber solvents to latex can also effect a thickening. In other cases powders such as clay or bentonite may be added in such proportion as to render the latex so thick that it may even become thixotropic. Other thickening agents such as zinc oxide and certain zinc salts appear to act by causing partial coalescence of the rubber globules: reference must here be made to the important possibility of modifying the surface tension of latex and increasing its wetting and penetrative power towards fabrics by the addition of a small proportion of colloidal material of the "wetting agent" type, certain complex organic sulfonates being particularly powerful.

2. A simpler and generally more satisfactory method for increasing viscosity is by concentration. By centrifuging in a special separator, concentrate is today being produced of 60% rubber content. The centrifuging incidentally serves to effect purification from foreign suspended material. Dunlop 60% latex (also marketed as "Jatex") is so produced.

Creaming may also be expedited by special agents such as gum tragacanth or ammonium alginate, the effect being presumably analogous to that of sedimentation of wine by colloids such as isinglass. With small additions of the creaming agent static latex in the course of a few hours gives a cream containing 60% or so of rubber; the presence of the additional creaming agent is not serious for many purposes. "Lotol" is a concentrate of this class. Filtration has been successfully applied on an experimental scale in Italy to the production of latex concentrate. Evaporation, either before or after compounding, provides another method for producing a thickened latex (*e.g.*, Revertex) for manufacturing purposes.

3. Minor adjustments of the viscosity are possible also in other ways, *e.g.*, by variation in the degree of alkalinity of the latex.

Vulcanization.—Instead of applying compounded latex to the primary production of an unvulcanized rubber article which is vulcanized in a subsequent operation, generally after drying, it is possible to effect vulcanization even in the aqueous dispersion itself (P. Schidrowitz, 1921). If stabilized latex containing sulfur in dispersion is heated to vulcanizing temperature the individual rubber globules actually become vulcanized. On subsequent removal of the water, for example, by evaporation, the vulcanized globules coalesce to form a continuous rubber mass. It is convenient for such vulcanization of latex to make use of powerful accelerators of vulcanization, also in a state of dispersion or solution, in order that the vulcanization process may be capable of occurring below 100° C. If the vulcanization process is carried too far not only is there a danger of impaired aging in an over-vulcanized article, but the coalescence of the rubber globules on drying is less complete and the rubber product may show signs of "shortness."

In view of the ease with which latex can thus be vulcanized, the difficulty of introducing reinforcing agents inside the rubber globule without some degree of milling appears somewhat surprising. The essential difference however, doubtless lies in the solubility of sulfur in rubber, whereas the particles of agents capable of reinforcing rubber are not soluble in that medium but nevertheless need to be very intimately dispersed therein.

Flocculation

Although rubber latex for most technical purposes not only contains a preservative such as ammonia, but also is additionally stabilized by the addition of suitable colloids in small proportion, such as casein or ammonium soap, coagulation for some purposes may occur with inconvenient ease, *e.g.*, ordinary latex is difficult to mix intimately with some powders and also with certain fibrous materials on account of a tendency to localized or irregular coagulation. This feature can be obviated by effecting incipient coagulation so as to produce a still fluid dispersion, or even paste, of coarser particles in which the sensitiveness towards formation of a continuous coagulum is no longer present. Indeed the resulting flocculated latex can be regarded as a fine dispersion of rubber coagulum. Flocculation can be

effected in a number of ways, generally by the use of a carefully selected coagulant under adjusted conditions; a solution of an aluminum salt has often been used. Such flocculated latex or "latex precipitate" can be used with especial advantage for mixing with fibres for the production of rubberized fibrous dispersions, which by filtration, screening, or other means of consolidation can be formed into sheet or other convenient shape. By combining in this way rubber and disintegrated textile or leather waste it is possible to make an artificial leather or leather substitute of attractive properties. A mixture of asbestos and rubber so produced can be consolidated for brake-linings. Indeed the possible applications of such "latex precipitate" are numerous. Furthermore, it can be freed from saline or other undesired soluble constituents by washing, *e.g.*, by decantation or other convenient means.

Crumbing.—If the flocculation of latex, especially of highly compounded latex, is carried further, a wet crumb-like mass is obtained which can be dried to form a compounded rubber powder. Such compounded rubber crumb can also be produced by simultaneous compounding and coagulation, for example, by successively adding to ordinary latex two reagents such as sodium silicate and magnesium sulfate. On addition of the second reagent a fine precipitate of compounding ingredient is formed concurrently with flocculation of the rubber globules, and a discontinuous crumb-like mass is obtained. The dried products can be used for manufacture of soft rubber and also ebonite articles by a simple molding operation in the same way as an ordinary molding powder.

Manufacture of Cellulose Acetate Foils

Whereas the manufacture of cellulose acetate rayon only offers any prospect of commercial success when carried out on a vast scale, the related industry of cellulose acetate transparent paper offers commercial possibilities even when operating on the basis of a comparatively small output. Five hundred kg. lots of cellulose acetate can be conveniently turned out in five batches on the basis of the method detailed in G. Bonwitt's "Das Zelluloid und seine Ersatzstoffe." For batches of this size, the requisite raw materials and their quantities are 320 kg. of air-dry cotton, 2,483 kg. of glacial acetic acid (100 per cent.), and 1,120 kg. of acetic anhydride, together with a catalyst in the shape of 9.6 kg. sulfuric acid (66° Be). For costing purposes, other major items are: 420 kilowatt hours of electrical energy, 118 cubic metres of water and 5,500 kg. steam.

In a suitable kneading apparatus constructed of bronze or nickel chrome steel, 512 kg. glacial acetic acid and 1.72 kg. of sulfuric acid catalyst are well stirred and rapidly raised to 30° C., when 64 kg. of air-dry cotton are added. After the cellulose has been hydrolyzed at the stated temperature for one hour, it is cooled to 16° C. and then incorporated with 224 kg. acetic anhydride which are run into the vessel in a thin stream, the temperature being maintained at a minimum of 25° C. This operation occupies a period of three hours. In the course of the succeeding three hours a spontaneous rise in temperature is suppressed by cooling so as to maintain the mass at 25° C. After a further three hours, the acetylation has so far proceeded that a sample of the clear, viscous mass may be tested for ready solubility in chloroform. At this point, which is reached after a total working period of approximately 10 hours, the primary cellulose acetate is precipitated by gradual addition of 800 kg. of ether over a period of one hour. The mixture of concentrated acetic acid, ether and sulfuric acid is run out through a tap in the base of the apparatus and the acetylated mass is thoroughly freed from acids by washing with ether, the last traces of the latter being removed by heating to 30 to 40° C. with the aid of a stream of air or inert gas.

Conversion of Primary Acetate

To convert the primary acetate into the secondary product, preference is given by the author to the process outlined by Miles in U. S. Patents 733, 729 and 838,350. After confirming the solubility of the primary acetate in chloroform and its insolubility in 99.5 per cent. acetone, there is slowly added, with stirring, a mixture of 41.6 kg. water, 38.4 kg. glacial acetic acid and 6.4 to 8 kg. sulfuric acid, care being taken to avoid any precipitation of the acetate. The actual hydrolysis of the primary acetate is effected by allowing the mass to stand for 12 to 16 hours at a temperature of 40 to 50° C. Complete hydrolysis is indicated by solubility of a washed sample in pure acetone. At this stage the reaction mass is indicated by solubility of a washed sample in pure acetone, gradually stirred into cold water when the acetate is at once washed until the reaction is neutral and dried at 35 to 40° C.

An alternative method, which possesses the advantage of yielding a solution of the secondary (acetone-soluble) acetate in acetic acid which can be kept unchanged for a long period, involves the use of sulfuryl chloride or chlorsulfonic acid as the catalyst. For working on a small factory scale, 300 kg. glacial acetic acid, 550 g. sulfuryl chloride and a proportion of acetic anhydride depending upon the water content of the cotton (6 kg. of 100 per cent. acetic anhydride per kg. of water) are thoroughly stirred together in a horizontal, double-walled cylindrical vessel constructed of copper or a suitable bronze alloy. After raising the temperature to 20° C., 80 kg. of air-dry cotton are gradually added. Gradual increase in temperature takes place, reaching 28° C. after seven hours reaction, and should under no circumstances be permitted to rise higher than 30° C. After intensive cooling to 19° C. the mass is allowed to stand over night.

Continuing early on the following morning, 245 kg. of 100 per cent. acetic acid are added to the mass which has been cooled to 18° C., the temperature rising to 54° C. after the reaction has progressed for 4½ hours, at which temperature the mass assumes a transparent, glassy appearance. The maximum permissible temperature for this stage of the reaction is 60° C. A temperature of 56° C. is attained at the end of a further 30 minutes, when precautions are taken to avoid any further development of heat. Samples of the reaction mixture are examined every 30 minutes on a glass plate. No fibrous structure should be visible and films obtained by precipitation in water should possess a good tensile strength and ready solubility in chloroform.

Transformation of this primary acetate into the secondary product is achieved by gradually stirring into the mass a hydrolyzing acid mixture consisting of 28.8 litres water, 31.2 litres 100 per cent. glacial acetic acid and 10 kg. sulfuric acid of 60° Be. Completion of the hydrolysis is effected after three hours warming at 58° C., but low viscosity solutions call for brief increase in temperature to 63 to 65° C. The quality of the product is nevertheless improved by carrying out the hydrolysis at a maximum temperature of 40° C. for a period of 24 hours. To judge the progress of the reaction, samples are covered with hot water in a mortar and tested for solubility in acetone. Rapid solution indicates completion of hydrolysis. Neither should it be forgotten that sulfuryl chloride is a highly toxic substance so that the acetylation should be carried out in well sealed apparatus and a well-ventilated factory. This catalyst may be replaced by chlorsulfonic acid in the proportion of two per cent. of the dry cotton.
—*Abstracted from Chemical Age*

Methods and principles involved in the prevention of atmospheric pollution from industrial processes abstracted from the Journal of the Western Society of Engineers.

Atmosphere

By Alexander
Ventilation Engineer

INDUSTRY is centering more and more around densely populated areas. As a result, the problem arises of preventing atmospheric pollution from the various industrial processes.

There are various methods of collecting dust classified as follows:

1. Settling chambers
2. Dust traps
3. Centrifugal separators
4. Scrubbers
5. Filters
6. Electrostatic precipitators

Settling chambers are fairly effective for removing large dust particles and make use of the principle of having a chamber large enough in cross section to allow the velocity of the gases to be reduced to such a point as to allow the dust to settle out by gravity.

Where large quantities of gas and dust are to be handled, the dust chambers must be so large that they are not economically or commercially feasible. In addition, these chambers cannot be installed on the suction side of high-suction induced draft fans.

Dust traps are in reality settling chambers, varied in shape, and containing baffle plates, staggered on the inside for increasing the efficiencies of collection.

There are many types and designs of centrifugal collectors which are often referred to as "cyclones." The separation of dust from an air stream by centrifugal collectors is dependent upon projecting the particles tangentially out of the air stream. The effectiveness of these collectors varies directly as the specific weight of the dust, and as the square of the tangential velocity, and inversely as the radius of rotation.

Cyclone collectors are not effective for very fine dust and often auxiliary collecting facilities must be used when the dust consists of a mixture of coarse and finely divided particles.

Scrubbers or washers make use of water or other liquids in which the dust is soluble, or where the dust will readily mix with the liquid used. This type of equipment is fairly efficient if the air is not too heavily dust-laden and provided that the dust or gas does not form corrosive solutions.

The main objections to this type of dust eliminator are the high operating expense due to the necessity of pumping and repumping the liquor and to the constant resistance head of the spray nozzles. In addition, there are the objections in some cases of reprocessing the trapped materials, while in other instances, where a sludge is produced, there are added difficulties and expense of keeping the washers clean and disposing of the waste.

A collector effecting dust separation by passing the dust-laden gases through a filtering medium, is usually referred to as the filter type. Cloth filters such as cot-

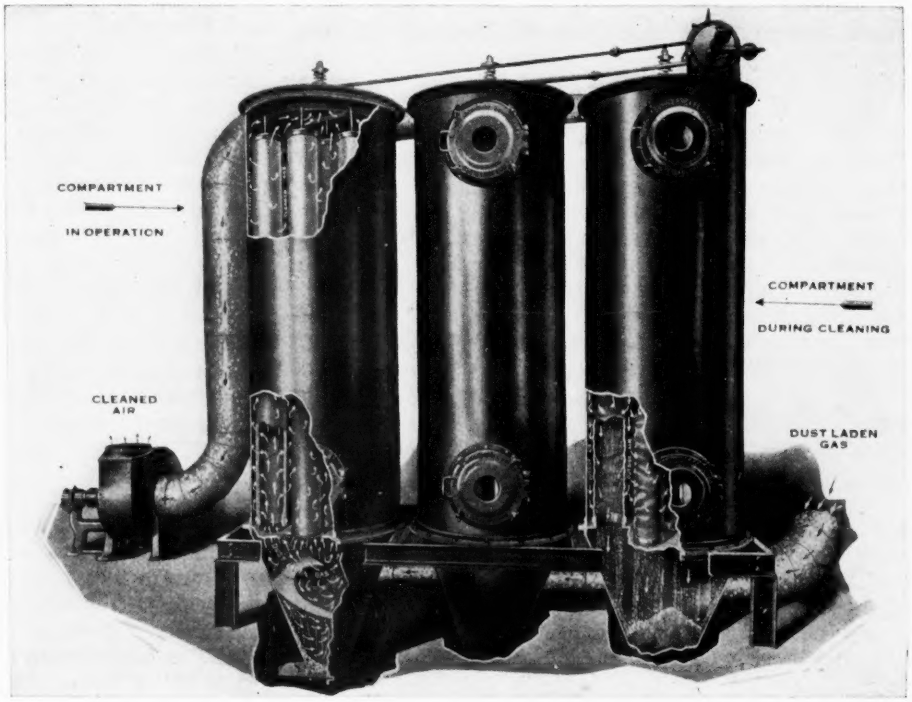


Fig. 1. Bag-type filter which draws air through cloth bags and screens out the dust.

Pollution

Zimmerman
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ton and wool are chiefly used as filter mediums for dusts arising from industrial processes, and are made use of mainly in the bag form. Cloth filters clog easily, and therefore some means of shaking or dislodging the dust adhering to the cloth surface and enlodged in the mesh must be used. If the mesh becomes clogged, the resistance is considerably increased and as a result there is a corresponding increase in power consumption.

Cloth-type filters cannot be used for hot gases or where the gases contain a high moisture content conducive to produce clogging, and in addition cannot be used where the gases are corrosive. In order to overcome the temperature and corrosive difficulties, added cooling and neutralizing facilities can be used.

Figure 1 shows a modern compact and efficient bag-type filter system. The dust-laden gas is admitted at the bottom of the gas-tight steel casing containing bag-type fabric filters, such as cotton, wool or asbestos. The coarser particles, due to a primary centrifugal action, are precipitated into the filter hoppers, while the finer particles pass up into the filter bags. As the gas passes through the bags, the solids are deposited on the inside of the bags, while the cleaned air is drawn out to the atmosphere through the exhaust manifold and fan.

In order to maintain a constant static pressure in the system, the filter bags are regularly and automatically cleaned by means of compressed air. The filters are made in units so that one unit can be shut off by dampers and the bags shaken, while the other units are kept in operation, thus making for continual operation. The allowable temperature in the bag type collector is 250° F., if woolen cloth is used and not over 210° F., if cotton cloth is used, and the lowest temperature should be above condensation.

The electrostatic precipitation method is usually referred to as the Cottrell system. It removes suspended solid or liquid particles from a gas stream by producing an electrical charge upon the particles and then utilizing the pull of a powerful electrical field to cause them to travel to an oppositely charged surface, to which they adhere.

The precipitator consists of a gas-tight chamber containing wire electrodes placed axially in a pipe, or suspended between plate surfaces placed in the gas stream and connected to a high-potential line of from 50,000 to 75,000 volts A. C., which is rectified to supply unidirectional current to the precipitator electrodes. The discharge, taking place from the wire electrodes connected to the other side of the line, causes the suspended particles in the gas to become charged by absorption of ions from the ionized gas and the particles move toward the negatively charged plates upon which they deposit, being removed either by gravity or mechanical cleaners.

The efficiency for removal is a function of the time and surface exposure of the gas stream to the electrical field, and is practically independent of the concentration of suspended material and gas temperature. Temperatures up to 1200°F. may be maintained, and with the use of corrosion-resistant materials in the construction, electrical precipitation is easily adaptable to the removal of suspended particles from a hot corrosive gas stream. The power consumption for electrical precipitation varies from 5 to 10 kilowatt hours per million feet of gas treated.

The reduction in pollution of air by poison gases harmful to plant and animal life and to building materials is a subject of great importance. Scrubbers, neutralizing systems, precipitators, absorption towers, etc., are being used to a great extent in an effective manner, and industry has realized that each particular emanation is a problem in itself. It is for this reason that each individual case must be treated in a manner best adapted to the process producing the harmful gases.

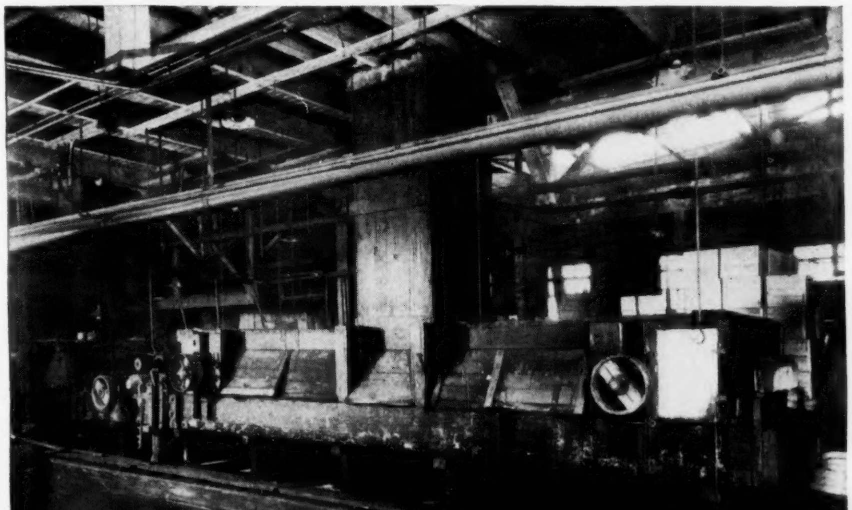
Fig. 2. Continuous strip pickling tanks with wooden hood and ducts to collect acid fumes.

The large number of successful dust and fume recovery systems, as installed in Chicago, are, in many instances, based upon principles suggested by the Division of Ventilation and Industrial Sanitation of the Chicago Board of Health. Practically every method of dust and fume recovery has been employed. In some cases the recovery systems have not only abated the nuisances of atmospheric pollutions, but have provided a source of revenue from the sale of the recovered materials.

A few of the outstanding fume and dust removal and recovery systems will be described in the following ing discussions:

Acids are used in a great many industrial processes and very often there is an emission of fumes which is not only detrimental to the health of the worker, but which also creates a neighborhood nuisance when discharged into the atmosphere. The problem of controlling the fumes is two-fold. It is not only essential that adequate means be provided for taking the fumes out of the plant, but it is also necessary to be able to dispose of those fumes in such a manner that they do not create a neighborhood nuisance.

Various methods may be used to dispose of acid fumes and in processes where large volumes of fumes are given off, the fumes may either be condensed and the acid reclaimed, or the fumes may be neutralized with alkalies to form salts. In many instances enough acid cannot be economically reclaimed to pay for the reclaiming process and consequently in the majority of cases equipment is constructed, not with the idea of reclaiming the acids, but for the purpose of their disposition.

Often the acid is given off in the form of a fine spray; that is, sometimes hydrogen is evolved in the form of small bubbles which are coated with acid. These bubbles rise from the vats, mix with steam evolved and escape to the atmosphere. In order to remove the acid the electrical precipitation and the absorption tower methods can be used. The former is often more costly than the latter and is not used as much for small installations.

A Chicago concern has installed equipment for controlling the acid-fume discharge from its plant and has thereby abated a neighborhood nuisance which was quite pronounced. The absorption tower method was used and has proven very satisfactory. The concern manufactures steel strapping which is coated either with lead or zinc as a protective means against rust. Before the strapping is coated, the outer layer of rust must be removed and this is accomplished by the so-called "pickling" process. "Pickling" is merely a cleansing operation in which the outer coat of rust is removed by treating a material with acid.

The steel strapping is automatically pulled through either the hydrochloric or sulfuric pickling vats which are entirely alike in construction, being made of fir wood six inches thick, and are approximately two feet by six feet by 24 feet in size. They are all enclosed so that none of the fumes can escape into the plant. A wooden stack made of one-inch fir leads the fumes and steam from the vat to the tower ducts. Previous to the installation of the absorption towers, the stack discharged the steam and acid into the atmosphere.

The hydrochloric acid vat contains 60% acid solution kept between 100° and 150° F. by means of live steam, while the sulfuric acid vat contains an acid solution which varies from 12% to 20% from time to time and is kept between 180° and 210° F. During the "pickling" there is an acid spray given off, as previously described herein, and this acid plus that carried off by the large amount of steam leaving the vat presents an acid control problem.

Before the installation of the acid absorption towers, neighborhood complaints were received by the Chicago Board of Health. These complaints pertained to the destructive action and the irritating properties of the acid. The acid was not only destructive to the property in the immediate vicinity, but was adding to its toll by destroying gutters, drain pipes and ducts belonging to the plant.

In order to determine the extent to which acid was being emitted from the plant, tests were made of the air two feet above the acid in the enclosed vats, and, in addition, tests were made in regard to the steam and acid being discharged from the exhaust stack

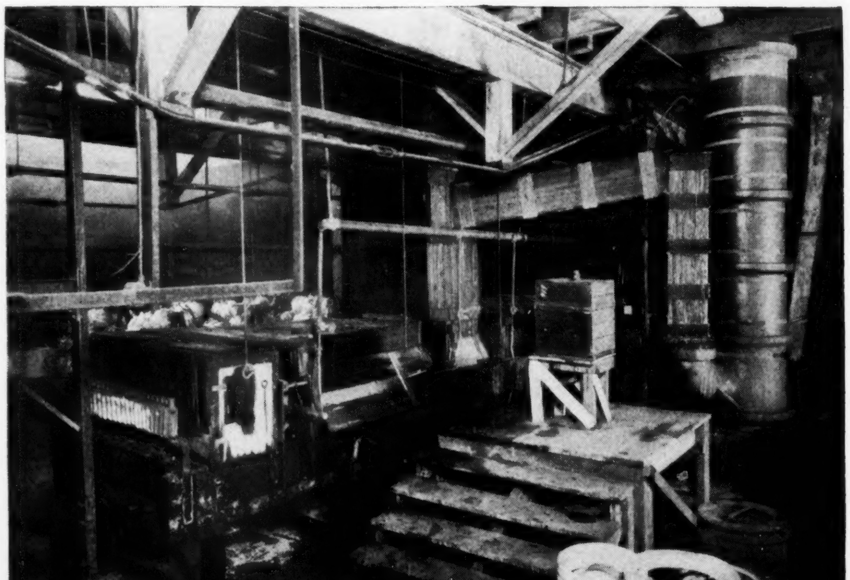

Fig. 2A. Wooden ducts convey acid fumes from pickling vats to absorption tower at right where the acid is washed out.

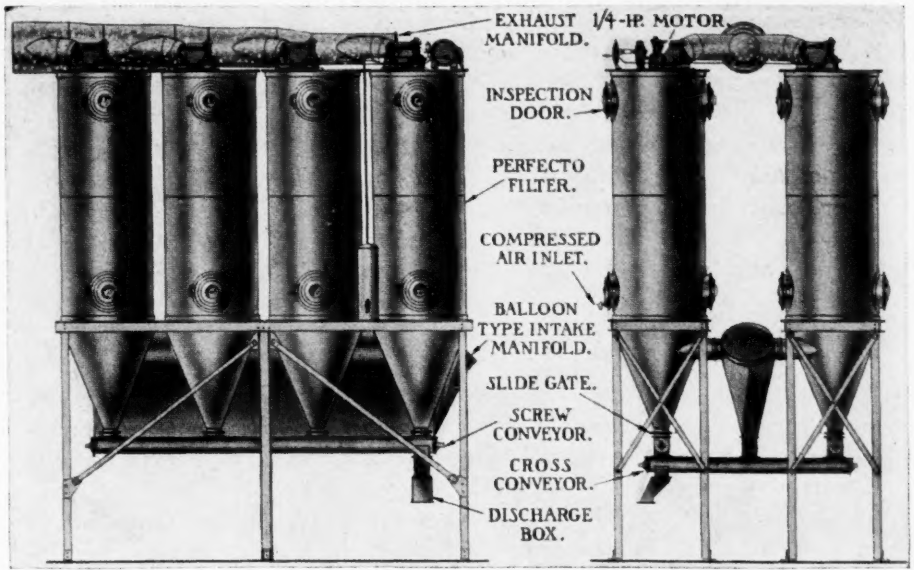

Fig. 3. Bag-type filter recovers zinc oxide from brass furnace gases.

into the atmosphere at a point about 60 feet above the ground. These tests were instrumental in showing how much the acid concentration of the air was changed from the time it left the vats until it reached the atmosphere.

The following data show the results obtained from the tests and that appreciable amounts of acid were being discharged.

HYDROCHLORIC ACID

Temperature of acid in vat—100° to 150° F.
Average velocity of air—237 ft. per minute.
Cross sectional size of stack—33½x42 inches.
Cross sectional area of stack—9.78 square feet.
Volume of air discharged from stack—2,310 c. f. m.
Acid anhydride above vat—106 parts per million parts of air.
Acid anhydride at stack discharge—52 parts per million parts of air.

SULPHURIC ACID

Temperature of acid in vat—180° to 210° F.
Average stack velocity of air—404 ft. per min.
Cross sectional size of stack—34½x39½ inches.
Cross sectional area of stack—9.48 sq. ft.
Volume of air discharged from stack—4,580 c. f. m.
Acid anhydride above vat—384 parts per million parts of air.
Acid anhydride at stack discharge—40 parts per million parts of air.

Two absorption towers were installed for controlling the acid and condensing the steam. Those two towers were practically the same in design with the exception of a few minor details. The acid and steam instead of being discharged into the atmosphere are now pulled through wooden duct work to the absorption towers, one tower being provided for each vat. The tower is three feet in diameter, 13 ft. in height and is made of glazed tile, acid-proof pipe in one case and ordinary 36-inch sewer tile pipe in the other.

As the acid and steam enter the absorption tower at the bottom, they are pulled upwards through the tower which is packed with silica cylinders, three inches in diameter, three inches in height and having spiral grooves running lengthwise on the inside.

Water is passed through the tower from the top in a downward motion, and the great number of spiral grooved cylinders furnishes a large area for surface contact between the acid, steam and water. As a result the steam is condensed and the acid is taken into the solution by the water.

In order to make full use of the water, an arrangement is made whereby the water leaving the towers at the bottom discharges into a specially constructed box, into which a 1½-in. pipe feeds fresh water while a certain portion of the tower water passes from the box through a pipe leading to the sewer.

The mixture of fresh water and tower drain water is pumped from the box by a special acid proof centrifugal pump driven at 1,750 r. p. m. by a 3-hp. motor. A 3-inch riser connected to the discharge side of the pump carries the mixed water to the top of the tower where it is evenly distributed on the inside by impingement on a ridged perforated plate.

Not only is there an economic advantage in reusing some of the wash water, but there is an added advantage due to the fact that a small amount of acid present in the wash water solution makes the solution more effective for taking the acid fumes into solution than fresh water.

In order to pull the fumes from over the vat and through a tower a 36-in. steel volume-exhaust type fan is used. This fan is driven by a 5-hp. motor at 1,200 r. p. m., and is placed on the air discharge side of the tower. This results in only air and a small amount of steam being discharged through the fan and out into the atmosphere. Tests made of the air discharge showed that there was no acid present.

As I have previously mentioned, one tower was constructed of special glazed acid-proof tile and one was constructed from ordinary standard 36-in sewer tile. The latter tower is standing up in condition just as well as the special glazed tower and cost less.

During the process of charging storage batteries hydrogen gas is evolved. This gas is evolved in the form of a bubble, which carries with it an outer coating of liquid sulfuric acid. In many instances mechanical exhaust systems draw out these gas bubbles from the charging room and then pass them through acid eliminators constructed out of a lead casing containing, on the interior, staggered plate-glass eliminator plates whose surfaces are roughened. The force of the impact of the gas bubbles against these plates causes the bubbles to burst, with the result that the acid coating is separated from the hydrogen bubble and then trickles down the eliminator plates into a receptacle from which it is drawn off and reused in the charging

process. The gas is passed through the chamber at a velocity of 500 to 600 ft. per minute.

During the period of refining and smelting of brass, appreciable amounts of zinc oxide fumes are found and in many instances are discharged to the atmosphere. The discharge of these fumes not only contributes to atmospheric pollution, but actually allows money to be scattered to the winds.

During the smelting and refining of brass, and to a lesser degree, during the casting, there is an appreciable metal loss, consisting chiefly of zinc and a smaller percentage of lead, tin and copper. A Chicago smelting and refining concern, operating three 46 to 50-ton reverberatory furnaces and one 42-inch blast furnace, calculated that their loss in metal was from three to four tons per day, and since this material was also creating a considerable neighborhood nuisance, they installed a modern bag-type filter system.

The equipment was designed to handle the gases and dust from either three reverberatory furnaces, or two furnaces and the 42-inch blast furnace operating at one time. Computations were made and as a result it was found that a volume capacity of 15,000 sq. ft. per minute measured at 240° F., would be required to carry the peak load. Since, during the smelting period, a minimum temperature of 2,000 degrees F. may be reached, sufficient cooling facilities for reducing the gas temperatures to 240° F. were necessary.

The equipment selected was of the steel cylinder, compartment, cloth-bag type, as shown in Fig. 1 and consisted of 12 compartments, each containing 18 filter bags with a total filter cloth area of 5,760 sq. ft. This allows for, roughly, 2½ cu. ft. of gas per sq. ft. of filter surface. A No. 29 Clarage exhaust fan driven by a 40-hp. motor was needed to induce the flow of gas. A long run of horizontal flue over the roof, a spray chamber and a radiation cooler consisting of three "U" tubes, 36 inches in diameter, and 32 ft. high, served to reduce the flue gases to a point below 240° F., as required for safety in operation.

Figure 3 shows the filter and auxiliary equipment arrangement. The tubular cloth filter bags supported in the chambers are open to the hopper below, and as the fumes enter a balloon-section manifold, they are drawn through the hoppers and then up through the cloth bags. The cleaned gases pass through the outlet manifold and exhaust fan, while the solids are retained on the inside of the bags. In order to remove the oxide adhering to the inner bag surfaces, a compressed air cleaning mechanism is provided. Each compartment in turn is automatically cut off the suction line by a damper, and the compressed air mechanism rapidly agitates the set of bags.

A reverse current of atmospheric air assists in settling the loosened dust which falls to a hopper and through a gate into a storage bin from which an inclined screw conveyor delivers the oxide to paper bags in which it is conveyed away. The construction of the filter units is such that any one can be cut off without disturbing the operation of the remainder of the units, thus assuring continuous 24-hour operation.

A 5-hp. motor drives the air compressor which delivers 50 cu. ft. of free air per minute. The temperature control mechanisms are set so that at a gas temperature of 225 deg. F., at the filter intake, the water line to the pressure pump opens; at 230 deg. F., the pump supplies water to the spray nozzle and at 240 deg. F., the emergency air inlet damper opens to cool the gas with outside air. The temperature should never exceed 240 deg. F., for any length of time, for, if woolen bags are subjected to higher temperatures, they will become scorched and thereby become materially weakened. The inlet damper is an emergency cooling device only, since its use reduces the draft at the furnace.

The static loss across the filters is four inches of water and is regularly checked by manometers inserted in the exhaust and intake lines.

There are two types of oxides collected and these are referred to as No. 1 and No. 2 oxide. The average analysis of No. 1 oxide and the extreme variations over an eight-month period showed:

	Averages Per Cent.	*Limiting Percentages*
Copper	0.33	0.05 to 1.00
Tin	0.95	0.07 to 10.69
Lead	7.68	2.31 to 29.48
Zinc	69.40	48.05 to 76.70

This oxide is sold for use as paint pigments, chemicals and for reduction to metal.

The No. 2 oxide contains about 60 per cent. zinc and is made up of cooler accumulations, branch cleanings, etc., and is used by zinc producers with their ore for reduction to metal.

During a period of over 13½ months oxide production and collection amounted to 1,237,000 lbs. of No. 1 oxide and 286,000 lbs. of No. 2 oxide. Only about 65 per cent. of the dust available was filtered due to the time required for alterations and adjustments. If all of the dust had been filtered, approximately 2,300,000 lbs. would have been collected.

The operating expense during this experimental period was greater than is to be expected in succeeding years. This, together with the business slump and subsequent reduction in the price of oxide, has brought only a small return on the investment of $35,000; however, as business conditions become better, the installation should pay for itself.

An appreciable saving in furnace oil consumption has been made since the installation of the collecting equipment, as an average daily use of 1,800 gallons or more of oil has been reduced at least 15 per cent. The production schedule has not been impaired; there has been very little change in tonnage smelted per hour, and the collection equipment has stabilized the furnace operation by eliminating the draft fluctuations.

The elimination of the smoke and dust in the vicinity of the plant has greatly contributed towards the reduction of atmospheric pollution, and is of considerable importance to the community.

Chemical Engineering in Chemical Design

By Robert L. Holliday

THE application of chemical engineering to the design end of chemical industry has been connected to an extent that appears to be unwise with chemistry as a science rather than an application. Too much attention is given by our chemical engineers to the laboratory and semi-works experiments and not enough to the design end. This work is usually turned over to men trained along the lines of mechanical engineering. There is no good reason for this. The present day chemical engineer should have equally as good a background for mechanics, as used in the chemical industry, as the mechanical engineer, and in addition where, if not in design, can the industry expect to get the best results of chemical engineering training?

This peroration is in line with a further thought on a training which is invaluable to the chemical engineer—that of draughting. I do not mean to imply that chemical engineers should be draughtsmen in competition with these specialists, but I do believe that it is important for them to acquire enough knowledge of this line to be able to direct work intelligently and that this can only be acquired by actually learning the mechanics of the draughting work.

This brings chemists in competition with regular draughtsmen and naturally the question of compensation arises. The trained draughtsman, being more of a tradesman than a technician, goes into a draughting room as a mechanic goes into a machine shop, to make it his life work. Draughting to a great extent consists of mechanical efforts which have to be guided by men higher up in the scale, who by reason of training and education, are suited for leaders. These latter men, however, must have at least some experience in the mechanical end of draughting in order to command the respect of the men under them and to know the mechanics of the job. This experience should be acquired "on the board." If draughting rooms in chemical industries were looked upon by the chemical engineer as he looks upon the chemical laboratory, more intelligent men could be developed. Industry would materially gain by getting a percentage of chemical engineers in where they belonged through intensive training rather than by inserting them farther along, where they attempt to get this training at a higher salary than is warranted and where impractical schemes are apt to creep in. If it were understood that taking a position in a draughting room was a stepping stone to a position outside the draughting room, based on education with experience, I believe much of the jealousy between the average draughtsman and the chemical engineer could be avoided and better results obtained.

So far as the mechanical disposition of design goes, a college degree will not help a man to be a better draughtsman. Most (I mean most in every sense) of the best men in this line never have gotten beyond high school grades. They, however, have picked this line as their life work and it is extremely discouraging to have a man come in competition with them who by reason of a degree commands more salary for this reason only. Plainly some better method than the present one of hiring men for this line of work should be more or less standardized. In other words the draughting room should be considered as much of a part of the industry as the plant or laboratory operations and should be treated accordingly as regards compensation.

I would therefore suggest that draughtsmen be divided into groups as follows:

Chief Draughtsman

Assistant Chief Draughtsman

Squad Bosses

Class A Draughtsmen (Layout) checkers, structural, mechanical, etc.

Class B Draughtsmen (Detailers) flow sheets, simple layout, etc.

Junior Draughtsmen (Tracers) correctors for checkers, etc.

Clerks (Blue print and photostats, timekeeping, orders, etc.)

Each of the above classes would be worth a base salary and it would be up to the individual to advance himself to a higher bracket in order to secure a better salary. This would obviate the greatest cause of sullenness and shirking—that of salary raises. No company can indefinitely raise salaries, and plenty of draughtsmen of high calibre are entirely satisfied never to leave their boards, who are ininvaluable, but who must feel that their future is protected. I can hear the wails as to "ambition" at this point, but remember this type of man is not always suited to executive work, and if he is, he will get there somehow through outside study and applica-

tion. If he is not, there is no reason to condemn him entirely for a questionable lack of ambition.

All this has no bearing on the chemical engineer, but it establishes the basis for the draughting mechanic and takes him out of direct competition with the chemical engineer in the higher brackets. Where the chemical engineer comes in, is that we should forget that he has a degree, so far as his compensation goes, and should enter him in this line as a junior draughtsman. He might profitably work along the draughting lines laid out above for at least ten years. With his technical training he should go far in this ten years training, and with this basis he should then be in line for executive work in the design end. If he does not go ahead, he should get into some other line.

Many chemical engineers will consider draughting beneath them, in view of their training; but in no other way can they better benefit the chemical industry, or themselves, than by entering the design end via the draughting board. This work, by the way, is equally as desirable as the operating or research career both as to future and compensation.

Merits of Work

During this training period, the young chemical engineer should not expect to be judged on his degree, but on his work. Moreover it should not be held too much against him if he finds competition too great with the regular draughtsmen. He must be patient. Everyone cannot be squad boss, but he can get the rudiments of design work as in no other way, and he should not disrupt an organization by expecting, simply due to his education, a better salary than the man trained in this line. At the end of this training period he should be taken out of the draughting room and advanced to design or project engineering, if such positions are available, and if not he should seek such a position elsewhere.

Chemical engineers with such a background would eliminate much of the erraticism of design that so often costs industry plenty of money. Experience in a draughting room would benefit a chemical engineer who has been directed by men selected for their ability and experience. All chemical projects in their final and even semi-works conception must eventually pass through this same draughting room, and if they are not designed properly, they have that much less chance of success. With the odds against success, as they are in almost any chemical process, a certain percentage of chemically trained men in the draughting room would be a good investment. The chemical industry needs more chemical engineering in the draughting room—properly directed—and this direction should come from men trained in chemical engineering rather than in other branches of the engineering profession.

Handling Fatty Acids

Tanks and containers of wood or iron, lined with lead, are commonly used for fatty acids. Lead by itself is very resistant to the action of the higher fatty acids, yet in the presence of iron some rather remarkable cases of rapid corrosion and leakage are at times met with. In many instances, also, however carefully the necessary repairs are carried out, the trouble is soon repeated; it remains, in fact, a chronic and rapidly recurrent evil when once corrosion has started. Lead, of course, expands much more than iron with the same increase of temperature, but does not undergo a corresponding contraction on cooling. The consequence is the appearance, often noted in lead-lined tanks, of a wavy or puckered surface of the lead. This is undoubtedly a predisposing condition for subsequent attack by the acids under the peculiar circumstances prevailing at the lead-iron interface. When once the fatty acid gets into the small interspaces between the lead lining and the iron, corrosion rapidly occurs.

In tests recently carried out in Germany, some large tanks, lead-lined to a thickness of 5 m.m. which had been repeatedly repaired for leaks due to corrosion, were thoroughly examined. It was found that the holes in the lead had evidently started on the inner side of the lining, and that the spaces between lining and iron were filled with a more or less unchanged fatty acid containing both iron and lead in solution, and having the form and appearance of a viscous brownish grease. The fact that, in carrying out leak repairs, it is not possible thoroughly to remove all this grease, is doubtless the reason why leaks very quickly form again in the same tank, and practically in the same place as at first.

Lead-lined Wooden Tanks Preferable

Four series of tests were carried out with lead and iron plates, double bent into the form of a three-sided prism, or in some cases nearly semi-circular, as follows: (1) Lead only in oleic acid (Twitchell split 90 per cent. soya oil fatty acid); (2) lead in oleic acid and water; (3) lead, iron, and oleic acid; (4) lead, iron, oleic acid, water. The lead plates were weighed at regular intervals till the end of a nine-months period. The main result was that corrosion of the lead plates only was comparatively slight as against that of the lead plates immersed with their sheet-iron covers. Tables and curves are given in the original report ("Seifens Zeit." 1933, 131-3, 165-7, 184-6), from which it is seen that lead plates 75 × 45 m.m., weighing originally from 54.3 g. to 65 g., lost the following amounts in nine months' immersion in fatty acid:—

	Original Weight	*Loss in Nine Months*
Test 1, Pb only in fatty acid	54.31 g.	2.81 g.
" 2, Pb and water in fatty acid	59.43 g.	2.79 g.
" 3, Pb and Fe in fatty acid	67.52 g.	15.41 g.
" 4, Pb, Fe, fatty acid, and H_2O	65.00 g.	15.91 g.

The corrosion is not uniform, and is much more marked on the upper edges of the plates than on the lower, where it is indeed almost negligible. The general practical conclusion seems to be that it is better to use lead-lined wooden tanks rather than iron wherever this is possible.—*Chemical Trade Journal*

Equipment Notes

Coppus Engineering, Worcester, Mass., reports a steady increase in the demand for its line of Annis Air Filters for ventilating and industrial purposes. Firm has recently appointed W. S. Gain, Room 418, Lafayette Bldg., Buffalo, N. Y., to handle its filter line in Northwestern New York, and McKean and Potter Counties, Pa.

The Kron Co., Bridgeport, Conn., has just developed a new platform scale that is portable and has a number of new ideas incorporated in it that are of direct interest to chemical companies requiring weighing operations. Complete details are available from the company's Bridgeport offices or agents.

Acid-Proofing for New and Old Containers

By A. A. Weinhardt
Ceramic Engineer

INCREASING demand for all kinds of acid-proof containers has been directly responsible for the introduction of two general classes of acid-resisting materials. In the first class may be placed those materials which are themselves adapted to fabrication, such as steel alloys. In the other class are those materials which are suitable for linings only, such as lead, rubber, vitreous enamel, and the material with which this paper deals, Porox. The essential factors influencing the selection of an acid-resisting material are the type of equipment, location in which it is to be used, and the service required of it. A hard or fast rule as to the proper selection is impractical because materials must accommodate themselves to many variables. However, in a general way the adaptability of such materials can be predetermined.

Where vessels such as pans, cans, kettles and objects of intricate design are required, the materials of the first class, such as stainless steel, etc. are obviously employed. They can be easily fabricated from comparatively thin stock and have the additional advantage of being very light in weight. Where tanks and vats are required, lead and rubber linings are generally used, although for many purposes the cost is almost prohibitive. For acid-proof floors and

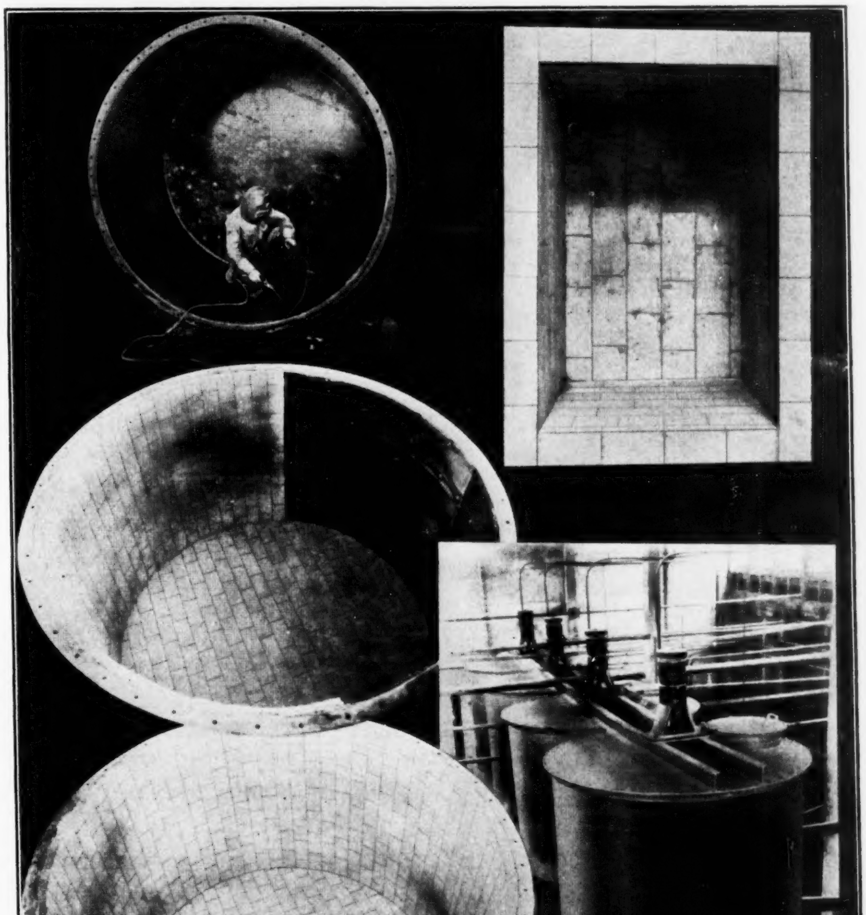

Illustration shows worker spot welding the expanded metal lining to walls and floor of the tank, also tanks partly and fully lined with Porox blocks laid in acid-resisting cement; rectangular vat made of Porox blocks laid with acid-resisting cement; installation in Mt. Clemens Pottery Co.

walls, such as are needed in chemical, drug, dairy and food plants, these materials are impracticable.

Porox which has been on the market over 25 years, until recently, has been confined largely to linings for pebble, ball and tube mills. During the past year a series of new developments should prove beneficial to industries having corrosion problems due to the use of sulfuric, nitric, muriatic, acetic and lactic acids as well as chlorine, sodium hypochlorite, aluminum chloride, hydrogen peroxide, etc. The first of these developments is a new type of pure white, acid-proof lining blocks of Porox. Second, a new white acid-proof Porox cement for use primarily with the new acid-proof blocks. Third, a new and novel method of applying these acid-proof blocks to steel tanks, by reinforcing the cement holding the blocks with steel wire or expanded metal welded to the inner surface of the steel receptacle.

Characteristics

Porox blocks are white, vitreous, non-absorbent and dense in structure. They have exceptional physical strength and will withstand the shock of continuous or intermittent impact under the most severe conditions. Porox obtains its close texture through the degree of fineness to which materials are ground and to the high point of vitrification reached. Materials used (clays, kaolins, etc.) must be uniform, under constant control and be carefully treated and washed. In the absence of certain fluxes and at the high temperature attained during the seventy-two hours of firing, no soluble silicates shall be formed. The effect of this firing is to change the clay in part to a crystalline product which is insoluble in acids and not affected by alkalies. The extremely high silica content also enhances its wear-resisting characteristics. The major advantage of complete resistance to chemical action by Porox is that the initial cost is the only expense. There is no spoilage of material due to stains from metallic salts and no variation in the processing liquids due to the tank lining. Porox lining, in conjunction with white porox, Acid-Proof Cement, can be used in nearly all chemical processing. For processes that do not require acid-proof linings but where a pure white sanitary lining is desired, regular white cement may be used in place of the acid-proof cement for laying the blocks.

The new method of applying Porox acid-proof block to steel tanks can best be illustrated by describing a recent installation at the Mount Clemens Pottery Company, Mount Clemens, Michigan. This installation consisted of a battery of four glaze tanks, 7'6" in diameter by 5'0" deep and 3/8" thick, lined with acid-proof blocks each equipped with a Patterson unipower agitator. An expanded metal lining was spot welded to the inner surface, as shown in the photograph. The interior of the tanks were then coated with a protective coat of asphalt paint. The underside of the tank tops, manhole openings, and manhole covers were covered with 1/8" of lead. The installation of the Porox lining was done on the job after tanks had been mounted on their concrete foundations. The expanded metal liner was covered with Porox acid-proof cement and the blocks set in place, as illustrated. An exceedingly strong bond is developed between the shell and tile, due to the reinforcement of the expanded metal. The interiors of these tanks present a pure white surface which not only has all of the acid and chemical resisting characteristics of porcelain, but offers maximum resistance to abrasion.

With the ever-changing methods brought about by new and improved developments, suitable structural materials for one process are quite often unsatisfactory for another. This, may necessitate separate and costly installations of tanks and process machinery of special alloys. A great deal of this expense can be avoided by the application of these acid-proof blocks to steel tanks, kettles, etc. by the new reinforced method. The interiors of equipment to be lined should first be thoroughly cleaned and the surface neutralized. Steel wire netting or expanded metal is next welded to the surface. Then the reinforcement is covered with Porox acid-proof cement and the Porox blocks set in place. In new plant construction, considerable savings in initial equipment cost can be effected by using reinforced acid-proof Porox blocks and cement. The mechanical strength of steel augmented by the non-resistant characteristics of Porox obviates the use of expensive alloys.

Porox Cement

Porox acid-proof cement was primarily developed for use with these blocks but can also be used for other purposes. It will resist strong, weak, corrosive acids and acid salts. It is quick-setting by chemical reaction and does not require long periods for drying. Neither does it require the application of artificial heat. Thus, joints do not squeeze out and subsequent cracking of blocks is avoided.

This cement can be used in the construction and maintenance of all kinds of acid-proof masonry such as storage, bleaching, pickling and electrolytic tanks, as well as tanning pits, filters, digesters, flues, autoclaves and for setting floor and wall tiling, etc. It will successfully withstand the action of the following: sulfuric acid, nitric acid, phosphoric acid, citric acid, butyric acid, lactic acid, oxalite acid, sodium chloride, sodium sulfate, calcium chloride, aluminum sulfate, magnesium chloride, alums and bleaching powder. It, like others containing silica, will not withstand the action of hydrofluoric acid. Quick-setting is an advantage in making repairs. It is only necessary to neutralize the affected masonry with a solution of caustic soda several times before applying.

New Products and Processes

Carbon Black Substitute

Germany consumes annually large quantities of carbon black for use in manufacture of rubber products, and this demand stimulated German interests to develop a process for manufacture of a black pigment of equal value from the materials available in the country. The domestic lampblack industry is an important one, but the product has only a limited range of uses and recent research work was directed toward gas as a starting point instead of liquid fuels used in the manufacture of lampblacks. As far as scientific and technical possibilities are concerned, carbon black was produced satisfactorily on a small scale and its quality was reported favorably by many industries. From the commercial standpoint, the methods were too costly and further attempts were discontinued.

Diphenylguanidine Production

A new process for the production of diphenylguanidine has been worked out by desulfurizing thiocarbanilide dissolved in ammoniacal alcohol with lead sulfate, recovering the solvent by distillation, and extracting the residue with hot water, when a clear solution of diphenylguanidine sulfate is obtained, from which diphenylguanidine is precipitated by adding alkali solution. The product is filtered, washed, dried, ground, and sieved. By this method diphenylguanidine (M. P. 147.5°C.) can be prepared in an average 94 per cent. yield from thiocarbanilide.

Red Zinc Oxide

A chemist in Germany has obtained a brick-red color zinc oxide by dissolving ordinary oxide in molten $(NH_4)NO_3$, and decomposing the latter by raising the temperature. The red color is said to be uninfluenced by repeated washing with water, but is destroyed by heating to a red heat.

New Lacquer Products

A new derivative of castor oil—namely, Butyl Acetyl Ricinoleate—has recently been put upon the market and is claimed to possess a greater plasticizing power for nitrocellulose lacquers and dope than castor oil, to yield films of greater gloss and pliability, and not to exude from the film. The new material is also claimed to have unique detergent properties, while its possibilities as a lubricant are held to be highly promising. It is miscible with most common organic liquids, but is practically insoluble in water. Methyl Isobutyl Ketone has been used to meet the needs for a higher boiling ketone having physical properties and solvent power corresponding to the "medium boiler" ester-type solvents. It is claimed that by its use it is possible to obtain lacquers of higher nitrocellulose content without increasing the viscosity.

Ammonium Alginate for Paperboard

Ammonium alginate, made from algin, a principal constituent of certain types of marine algae, is a mucilaginous substance soluble in water. It increases the strength of the paper fiber considerably, softening the same and aiding materially, much better than starch, in retaining the fillers used. It is claimed actually to penetrate the pulp fibers, surrounding the filler and actually gluing together the individual fibers in paperboard and cardboard. One pound of ammonium alginate replaces twelve pounds of starch as regards viscosity. When it is merely desired to increase the stiffness of the board, all of the starch need not be replaced by ammonium alginate, but merely a part.

New Wood Preservative

A method recently developed to obviate exposure losses of water soluble salts used for wood preservation uses chromium salts as a fixing agent to render the preservative salts insoluble. A preparation based on this principle has been manufactured and is said to consist essentially of dinitrophenol fluorine and arsenic salts with chromium salts as a fixing constituent. This mixture is handled in the mechanical process of wood treatment. Its water solution is said to be stable at boiling temperature and non-corrosive to metals.

Nephelite New Source of Alumina

In view of the growing demands upon bauxite as a raw material for alumina manufacture, interest will be aroused by plans to exploit the immense deposits of nephelite (an aluminum silicate) on the peninsular of Kola in the Arctic Circle. It is stated that treatment of nephelite ore with hydrofluoric acid offers some prospect of commercial success. Of peculiar importance in the working up of aluminum silicate ores is the value of the by-products since the relatively low market price of aluminum does not in itself offset the expenditure on reagents. From the by-product standpoint, therefore, the decomposition of nephelites and other aluminum silicates by means of hydrofluoric acid is an attractive one, owing to the large output of pure silicate acid, and the possibility of obtaining also such technically important compounds as sodium or potassium silicofluoride and potassium or sodium fluoride. The outlet for the hydrofluoric acid process will be substantially improved by a cheap source of production of this reagent, and it is interesting to note the probable existence of fluorite deposits in the vicinity of the area of operations.

Anti-Corrosion Development

Interest has been aroused, particularly in the automobile industry, by the development of a process by which a thin oxide coating is produced on aluminum, thus protecting it from corrosion. The coating is said to be identical with corundum, and possesses the same hardness, is non-porous and colorless, and does not change the appearance of the metal. It can be produced in various colors and is eminently suitable for use in the construction of light cars built of aluminum and plywood.

Water-White Lead Drier

A water-white lead drier, which is completely neutral as to color and actually lightens the color of the oil, it was stated, should have an excellent value in production of pure white paints, enamels and synthetics. At a recent showing of Nuodex water-white lead, which is 16 per cent. metal, before a group of production men, it was definitely shown that the ideal drier had been developed.

New Bleaching Process

A new method of bleaching has been discovered which gives a fresh appearance to garments which hitherto have shown signs of deterioration in color and is said to confer upon wool fabrics a permanent white not susceptible to "yellowing" by laundering or dry-cleaning, and is applicable to all forms of white woolen fabrics, including flannels, blankets, and tennis-ball cloth.

The new process, it is stated, is now established commercially under mill conditions, and its success has been confirmed by practical tests made at home and in India and Australia. Many important firms have adopted it and are marketing in increasing quantities flannels, blankets, woolen underwear, and, indeed, all forms of white goods made from wool to which it has been applied.

Chemical Reader's Digest

Flame-proofing Textiles

Textiles submitted to the action of a sufficiently high temperature are gradually carbonized; that is to say their elements, hydrogen, sulfur and oxygen are released in the form of steam and sulfurous anhydride and carbon only remains. This combustibility is a particularly grave danger which can be counteracted by flame-proofing. This is achieved by enveloping the fibers in substances which will keep them out of contact with oxygen during the action of the heat. It is also necessary to check the speed of the propagation of the fire, that the flame-proofing substances should give off inert gases under the action of the heat; these gases mingling with the combustible gases and rendering them non-inflammable. A certain number of mineral salts possess these properties, the most useful being those which melt at a low temperature, parting with their water of crystallization, or decompose with the evolution of inert gases. Formulas are given for soluble salts; lead sulfate and aluminum acetate; zinc oxide treatment; ammonium chloride; vitrified coating, with treatment in each case.——R. Chesneau in *Textile Colorist*, June 1933, p. 375.

British Alkali Report

Chief inspector under the Alkali, Etc., Works Regulation Act and Alkali Works Order, has issued the sixty-ninth annual report on the work of his Department covering 1932. Report states that the number of works registered in 1932 was 921, which involved the operation of 1,720 separate processes. There was a reduction since the previous year of 63 in the number of works and 73 in the number of separate processes. The most substantial decreases have been in the number of works registered for the manufacture of sulfate of ammonia and for tar distillation, but to an extent this has been offset by an increase in the number of benzene works.

A substantially greater amount of sulfuric was produced in 1932 than in the previous year. Comparison is made, however, with a year when conditions were extraordinarily bad, so that even now only about 60 per cent. of the capacity of the available plant is in use.

Staveley Coal and Iron Co., Ltd., has erected and put into operation a large Bachmann plant for the production of bleaching powder. This is the first of its kind in this country and is said, up to the present, to be entirely successful. Plant consists of a series of shelves built over one another and a central shaft, carrying arms and rakes, which rotates slowly. Arrangement is similar to that of a Herreshoff furnace, whereby lime is worked from the centre of one shelf to the circumference and then dropped to the next shelf where it is worked to the centre again, and so on. Chlorine gas is admitted near the bottom. Tail gases are draughted to an earthenware tower, which is fed with soda, and thence to atmosphere. Slaking and feeding of lime is chiefly mechanical and a draughting arrangement prevents dissipation of dust during packing. Entire plant being under suction, there is little possibility of accidental chlorine leakage.—*Chemical Age*, July 8, 1933, p. 27.

Soviet Nitrogen

First Synthetic Ammonia Plant in Soviet Russia, designed to produce 48 tons of anhydrous ammonia per day, was built by Casale of Italy in 1927. It is located near sulfuric acid and superphosphate plants in Derjinsk, a small town near Nijni-Novgorod, and has been operated since 1928.

Next plant will be built in Chirchiki, near Tashkent, with a capacity of about 150,000 tons of ammonia per year, to supply fertilizers to the cotton fields in this section of the country. Electric current, supplied by a 200,000-horsepower hydroelectric plant built on the rapids of river Chirchiki, will be used for the electrolysis of water to supply hydrogen, and nitrogen will be made either by burning hydrogen or by the liquefaction of air. The synthesis will be similar to that of other Soviet plants and the Haber-Bosch process will be used.

Two other nitrogen plants will be built in the Magnitogorsk and Kuznetz metallurgical plants. Here the source of hydrogen will be coke-oven gas. The Nitrogen Research Institute in Moscow is working on methods for the complete and economical conversion of methane in coke-oven gas into hydrogen. If no satisfactory method is found in the near future, two of the above-mentioned plants will use the liquefaction process for extraction of hydrogen which will resemble the existing installation in Gorlovka.—*Industrial & Engineering Chemistry* (News Section) The Nitrogen Industry in U. S. S. R. N. Almoian.

Twenty-five Years of Chemical Engineering Progress

Twenty-five years of chemical engineering achievement in America in virtually all branches of the industry is summarized in the twenty-five essays by recognized authorities comprising this volume, published by the A. I. Ch.E. on the occasion of the Silver Anniversary of its founding in 1908. Individually each essay reviews the progress made during the last quarter century in a definite industrial field. Collectively they portray the stirring epic of the birth and growth of chemical engineering in America and the events that in a mere 25 years have transformed it from a formless conglomerate of chemistry and engineering into the crystalline structure of a new profession, recognized today as a definite branch of engineering.

Fortunate, indeed, it is that most of the men who have shaped the destiny of chemical engineering are still in active service and have contributed in this volume from a wealth of professional experience that covers the entire period under discussion. Arthur D. Little, the dean of American chemical engineers, traces the history of research and touches on the most significant developments in this line and their implications to manufacturer, banker and the general public. E. R. Weidlein, Mellon Director in collaboration with L. W. Bass, presents a statistical survey of the economics of the chemical industries for the period 1909-31, showing, among other things, number of establishments, wage earners and salaried employees in different branches of the industry, together with data on wages, salaries, cost of materials, value of output and manufacturing profits. Manufacturing indexes of different industries, fuel and power consumption, exports and imports and financial aspects, too, are set forth in tabular form with explanatory notes.

Other contributors discuss specific rather than general features of certain chemical industries. For example, Cyanamid's, W. S. Landis discusses advances in the electrochemical industries; F. C. Frary, of Aluminum Company of America, writes on electrometallurgical progress with special emphasis on the ferro-alloys; and A. T. Weith and A. V. H. Mory, both of Bakelite, review plastics as an old industry recently revitalized by modern chemical technique. George Oenslager of Goodrich, (this year's Perkin Medallist), reviews the chemical and engineering advances in the rubber industry, especially in connection with accelerators; H. W. Sheldon, Socony-Vacuum, traces cracking developments in petroleum refining, and C. O. Brown of the Chemical Engineering Corp., discusses chemical engineering's most brilliant recent development, high pressure synthesis, with special reference to hydrogenation of petroleum, the making of synthetic ammonia, and methanol, the design of equipment and the selection of catalysts.

Chemical Facts and Figures

Anti-Freeze Competition

Another major bombshell has exploded in the anti-freeze industry. Stanco, Inc., (Standard of N. J. subsidiary) will market this winter a mixture of isopropyl and methyl alcohols in competition with present C. D. 5 alcohol. Mixture contains approximately 65% isopropyl and 35% methyl, and it is learned that the production contemplated for the coming season is about 3,000,000 gals. Last season about 23,000,000 gals. of C. D. 5 were produced. It is thought that actual consumption was much larger than this figure, however, as the carryover from the previous season was quite large. An average of about 30,000,000 gals. represents a normal year. Taking this latter figure the proposed production of Stanco of the isopropyl-methyl alcohol mixture of 3,000,000 gals. is about 10% of the total.

A large part of the 3,000,000 gals. are said to have been already contracted for. Major portion will be distributed through service stations of the various Standard companies east of the Rocky Mountains. These form an excellent merchandising background for such distribution. The largest part of the volume will, of course, be shipped in drums, but the question of smaller containers for retail trade is being seriously considered and this step may be taken very shortly.

Anti-freeze business has been the backlog of the alcohol industry since prohibition. First serious challenge came from the glycerine producers, who were seeking additional outlets for their over-production. A refined glycerine has been on the market for several years and many of the repackers and jobbers of anti-freeze turned to mixtures of alcohol and glycerine. Second real challenge came from Union Carbide when it introduced "Prestone"—ethyleneglycol. In the past few years the production of synthetic alcohols—ethyl, methyl—has further complicated the matter for producers of C. D. 5 alcohol from blackstrap molasses. Now comes the latest—a mixture of isopropyl and methyl alcohols made synthetically.

Freight Rates

I. C. C. denied a petition Aug. 5 for a general reduction in all freight rates.*

*Chemical industry entered in 1931 strong objections through the M. C. A. to general increase asked for by the railroads on plea that earnings were not sufficient to pay fixed charges. Banks, trust companies, etc. joined in the railroad plea. Traffic committee head, Harry M. Mabey (Mathieson general traffic manager) appeared at hearings Aug. 12-13, 1931 in opposition to a horizontal 15% increase. (See CHEMICAL MARKETS, Sept., 1931, p. 289). Increase was denied, but certain specific rate rises were permitted (See CHEMICAL MARKETS, Nov., 1931, p. 497.

Commission found that existing general level of railroad freight rates is more than 20% below that of 1920; the freight rate level is not depressing the volume of traffic or business of the country as a whole; that rate reductions would not stimulate the aggregate volume of traffic by railroads; that after allowance for the recent upturn in commodity prices, the freight rate level still is relatively higher than the commodity price level and that the value of commodities transported is one factor in determining reasonable rates, but commodity prices are not controlling.

Precarious Position

Commission further found that the earnings of rail carriers have been greatly affected by loss of traffic to motor and water carriers and by reduced rates made to meet competition of such carriers; that the net revenue of the rail carriers in 1932 was the lowest in many years, and that if rates were lowered as much as 10% the net revenue in the near future probably would fall short of meeting fixed charges.

COMING EVENTS

Salesmens' Golf Tournament, Leewood Country Club, Westchester, Aug. 15.

Association of Dairy, Food, and Drug Officials of U. S., Pfister Hotel, Milwaukee, Sept. 5-8.

Electrochemical Society, fall meeting, Chicago, Ill., Sept. 7-9.

American Association of Textile Chemists & Colorists, Hotel Congress. Chicago, Sept. 8-9.

American Chemical Society, Chicago, Week of Sept. 11.

National Petroleum Association, Annual Meeting, Hotel Traymore, Atlantic City, Sept. 20-22.

American Association Natural Gas Dept., Chicago, Sept. 25.

American Society of Municipal Engineers, Chicago, Sept. 25-27.

Technical Association of the Pulp & Paper Industry, fall meeting, Appleton Wis., Sept. 26-28.

National Metal Congress and Exposition, October 2-6.

Twenty-second Annual Safety Congress, Hotel Stevens, Chicago, Oct. 2-6.

American Welding Society, Hotel Book-Cadillac, Detroit, Mich., Oct. 2-6.

American Bottlers of Carbonated Beverages, Annual Meeting, Louisville, Ky., Oct. 9-13.

American Oil Chemists' Society, Congress Hotel, Chicago, Oct. 12-13.

American Petroleum Institute, Chicago, Ill., Oct. 24-26.

Federation of Paint & Varnish Prod. Clubs, Edgewater Beach Hotel, Chicago Oct. 26.

National Paint, Oil & Varnish Association, Edgewater Beach Hotel, Chicago, Oct. 27-30.

Exposition of Chemical Industries, Grand Central Palace, N. Y. City, Dec. 4-9.

American Society of Mechanical Engineers, N. Y. City, Dec. 4-9.

Fifth National Organic Chemistry Symposium, Cornell, Dec. 28-30.

Commissioner Clyde B. Aitchison wrote a dissenting opinion. Commissioners Lee and Porter concurred with Aitchison's views. Commissioner Eastman, Federal Co-Ordinator of Railroads, did not participate in the disposition of the case.

Lacquer Patents Again

So-called Flaherty lacquer patent litigation (du Pont vs. Glidden) reached a second stage last month when the U. S. Circuit Court of Appeals, for the 2nd Circuit, in a decision written by Judge Learned Hand, reversed the decision of the lower court (District Court for the Eastern District of N. Y.) which had held that claims, 2, 3, 6, 8, 9, 12, and 17 of the patent were invalid because of noninvention.

Opinion of the appellate court reviews at length the history of the early experiments on low viscosity lacquers. Following summary presents conclusions of the judges:

"Therefore, we are disposed to regard Flaherty's work in this case as invention. From him dated in fact a contribution whose value cannot be denied; to him must be attributed the first practicable, low-viscosity lacquers, whose desirability had been known long enough to make them the subject of much experiment; we can discover nothing but the control of viscosity which achieved success, obvious as that may now seem; that information turned out to be enough to direct the art. There may be some illusion in all this, of which we are not aware, but as the case stands, to assimilate his work to mere craftsmanship would be a denial of the facts before us. Moreover, the patent has been recognized by fifty-two manufacturers who have taken licenses. True, this must not be pressed too far; it is easier to pay tribute than to fight, and a substantial part of the trade has combined in this contest. But courts have always treated such recognition as a relevant consideration and certainly it may not be altogether disregarded. Thropp's Sons v. Sieberling, 264 U. S. 320, 329, 330.

Flaherty originally claimed a higher limit of viscosity than 4.6 seconds. Not only was he forced to disclaim, after suit brought, claims to 16.2 second, nitro-cellulose, but his specifications still contain the statement that "generally" the critical limit is as high as that (page 3, lines 2-9). He was more acquisitive than he should have been, as inventors often are; but that ought not to take away from him his invention, if he made one. The claims in suit are limited to 4.6-second viscosity, and that is what he actually found. The very purpose of the disclaimer statute is to allow retraction, in the absence of bad faith, which is not here asserted. That he should have wrongly guessed that the limit was higher does not abate from the fact that he has found the actual limit; that which the art has now adopted. He could not be expected to set a definite figure; there is none for viscosity may vary even below his limit. But he did set that limit definitely, and in a chemical patent that is all that is required. The supposed vacillation in his conception seems to us to be no more than is permissible to one who has in fact discovered a chemical invention of substance, but who is in doubt whether it may not extend beyond his experimental verification. Somewhere no doubt he must set his bounds at his peril, and that he did."

Petition for Rehearing

The defendant Glidden has filed a petition for rehearing alleging the following:

1. The prior workers in the art had not failed to make a useful lacquer from nitrocellulose whose viscosity-characteristic was below Flaherty's limit. It was not in the nitrocellulose base but in the compounding ingredients that Bacon's Adamantine X differed from Flaherty's viscolac.

2. It was not viscolac that replaced automobile body paints and wood varnishes, and those commercial applications cannot, as a matter of fact, be invoked to establish invention in Flaherty's disclosure over the prior general knowledge of the relation of viscosity-characteristic to covering power and the prior particular knowledge of nitrocellulose lacquers (of more limited commercial applications) containing nitrocellulose having a viscosity-characteristic below 4.6 seconds.

3. The work, knowledge and prior disclosure and use of Carlsson & Thall, of Bacon, and of Doerflinger, is direct anticipation.

4. Bacon was ahead of Flaherty at every step of the closely parallel paths they followed. Between February 7 and February 15, 1921 Flaherty modified the nitrocellulose base of his brush handle lacquer in the same way and for the same purpose that Bacon had modified his Adamantine XX to produce Adamantine X prior to January 13, 1921.

5. Doerflinger's product was below Flaherty's limit and was such a lacquer as Flaherty's patented viscolac.

6. The limit of viscosity-characteristic of the Flaherty patent is not critical in any sense.

7. It is not true that, as this Court supposed, a point was found by Flaherty, or has been found by any one else, below which the resultant film is too "brittle to be corrected by softeners."

8. This Court has followed to a conclusion clearly erroneous a path that is closed by a substantive rule of law.

9. Claims 12 and 17 are necessarily invalid.*

Washington

Tennessee Valley Authority announced July 15, general nature of the program of development that has been planned thus far. Program includes experiments in transmission of electric current, in the production of building materials, and a demonstration of the economical manufacture of fertilizer on a four-county scale. It contemplates building a model town, establishment of vocational schools and domestic industries, and improved methods of reforestation and prevention of soil erosion. Building of a dam as another forward step in power development, flood control, and opening of the Tennessee River to a greater degree of navigation constitute but a small part of the program of the Authority in its "new deal" for that river basin.

Dr. Arthur E. Morgan, chairman of the Authority, states that full details of the program cannot be announced at this time, except to say that "interesting experiments" in power transmission are being made and that policies adopted by the Authority with respect to power, fertilizer, etc., will depend on scientific and other data now being prepared.

Cotton Acreage Reduction

Secretary Wallace signed a proclamation, July 14, putting into effect acreage reduction program. He stated that approximately 3,500,000 bales or in excess of 9,000,000 acres had been offered to the Government under terms of the proposals submitted to growers. Secretary stated that estimates placed on their yields by farmers have been conservative and fair and consistent with previously recorded averages. A processing tax of 4.2c per lb. of lint cotton became effective Aug. 1. This rate equals difference between current average farm price of cotton and the fair exchange value of cotton.

Government cotton acreage report as of July 1, released July 8, shows that there are 40,798,000 acres of cotton in cultivation, which compares with 36,542,000 acres in cultivation on July 1, 1932—an increase of 11.6%. Increases for principal cotton-growing States were Mississippi 1%; North Carolina 5%; South Carolina, Georgia, Alabama, Louisiana, and Arkansas 6%; Tennessee 8%; Virginia and Missouri 10%; Texas 16%, and Oklahoma 30%.

All commercial standardization work done in recent years by the Dept. of Commerce has been transferred to the American Standards' Association, it was announced July 19 by Secretary of Commerce, Daniel C. Roper.

Five divisions of the Bureau of Standards which have been conducting this work will be reduced or abolished gradually as the association is able to take over their functions. They are the divisions of simplified practice, building and housing, specifications, trade standards, and safety standards.

Coincident with the announcement of the cuts in the Department's staff and activities, the President issued an executive order abolishing the National Committee on Wood Utilization, which has been closely associated with the department. This committee was financed co-operatively by the government and industry, each contributing about $15,000 a year.

Commerce Dept.'s monthly import and export statistics "felled" by economy program. Quarterly statements are planned, first report will cover quarter ending Sept. 30.

Chemical Section, National Safety Council, is trying to find chemical company with best accident record.

Obituaries

W. Acheson Smith

W. Acheson Smith, 54, president, Acheson Graphite and a National Carbon vice-president, died July 12 in John Hopkins, Baltimore. Mr. Smith was a son of William H. Smith, who was for many years chief engineer of Carnegie Steel and later of U. S. Steel. An uncle, Dr. Edward Goodrich Acheson, founded the Carborundum Co. Mr. Smith was a graduate of the University of Pittsburgh.

His association with Acheson Graphite had been continuous since 1908. Before his election to the presidency he had held several other important positions. At his death he was also a director of the Carborundum Corp. and the Power City Trust of Niagara Falls, N. Y.

He was a member of the board of managers and a former president of the Electro-Chemical Society. During the World War period he served on the War Industries Advisory Board.† Mr. Smith belonged to the American Institute of Mining and Metallurgical Engineers, A. C. S., Union League Club of N. Y., and the Chemists Club. He was a Mason. Surviving: his widow, a daughter, and a brother.

George M. Lynn

George M. Lynn, 37, brilliant chief chemist, Columbia Chemical (Pittsburgh Plate Glass) was killed July 15 in an automobile accident near Cleveland. He graduated from the Lawrence High School in 1916 and entered Kansas University, from which he graduated with a B. S. in 1921. He continued his work in Chemical Engineering, receiving a Master's Degree in 1922.

Honored with a fellowship from G. E. to Yale, he continued study and in 1925 received his doctor's degree. During 1925 he taught in the University of Pittsburgh. In 1926, he was chemist at the U. S. Bureau of Mines at Pittsburgh, and since 1928 has been chief chemist in charge of the research dept. of Columbia Chemical.

Frank Ross Raiff, 63, a former American Smelting & Refining vice-president, died July 18 at Rutherford, N. J.

Norman Schaff, assistant secretary of Barrett, died suddenly from a heart attack July 18.

Corn Report

Although demand for products of corn has recently slackened somewhat from the uprush in previous months, corn refining industry, through Corn Industries Research Foundation, reports increase in June volume of 20% in comparison with June of last year. For six months ending in June total grind of 11 refiners was 38,052,141 bu. compared with 29,678,703 bu.

*See also Chemical Markets, Dec. 1932, p. 539; July, 1932, p. 53; March, 1931, p. 290; June, 1931, p. 625; July, 1931, p. 666. Case was first tried in the District Court in Brooklyn during week of June 13, 1932. Shortly before the trial du Pont filed a disclaimer on claims 13 to 16 on the ground that these claims inadvertently made the patent broader than the inventor's rights. Oral arguments in the appeal were heard during the third week in June and decision rendered in July. On Aug. 9 Circuit Court of Appeals granted Glidden petition for a rehearing but set no date.

†Sixteen years ago Mr. Smith played an important part in the wartime Chemical Alliance, now again revived in a national crisis.

for first six months of last year, an increase of about 30% for the period. This sustained improvement in the demand for starches, dextrines, sugars, syrups and other derivatives of American corn used as food and as basic material in other industrial manufacturing operations, is a reflection of the broadening activities in all lines of business.

Personnel

Kaiser Leaves Hercules

Following the resignation of Harry E. Kaiser as director of the Hercules Experiment Station, Hercules Powder has announced appointment of O. A. Pickett as acting director, effective Aug. 15.

Mr. Kaiser, whose resignation was accepted with regret by Hercules officials, is returning to California where his presence is necessitated by business and family interests. He has been connected with Hercules research work since 1918 and has been director of the Experiment Station since 1922. During this period Hercules Powder has made important research developments in the explosives, naval stores, cellulose and cellulose products fields. In 1931 the Station was transferred from Kenvil, N. J. to elaborate new laboratories near Wilmington, Delaware, in the design of which Mr. Kaiser had an active part. He is a graduate of the University of California. O. A. Pickett for a number of years has been in charge of the Experiment Station Physical Chemistry Division.

Committee Placements

Concrete proof of the services being rendered the industry's unemployed in the metropolitan district by the Breyer Committee: William T. White, formerly Combustion Utilities research chemist is now with Natural Products Refining (bichromates); Howard A. Young, formerly sales engineer with Oliver United Filters, is with U. S. Rubber; Eugene W. Lieben, formerly a General Chemical chemist, is with Monsanto at St. Louis.

Committee on Unemployment & Relief for Chemists & Chemical Engineers, Frank G. Breyer, executive chairman, M. R. Bhagwat, secretary, Robert T. Baldwin, treasurer.

Parks to Potash

Horace M. Albright, National Park Service director for past four and one-half years, received a warm letter of recommendation from Secretary of the Interior Ickes, as he left Washington July 12 to become U. S. Potash's general manager. "Brilliant career in the federal park system" was the particular citation.*

James Kilcommons, formerly Kalbfleisch (now Cyanamid), is with Philipp Bros.

R. E. Zimmerman, who has been assistant to the president of Carnegie Steel, has been made a vice-president in charge of research and technology.

Thomas Micarta Sales Head

Westinghouse has appointed H. C. Thomas head of Micarta Sales. Upon graduating from Purdue in 1910, Mr. Thomas joined apprenticeship course of

Sales Manager Thomas (Westinghouse) sees big future for Micarta (Plastic Material)

Westinghouse. He next joined the repair department, later was transferred to the circuit breaker and switch section of the supply department and then became a salesman in the St. Louis office. His service with Westinghouse was interrupted by war duties, but he returned to St. Louis in 1919.

When a merchandizing department was created in 1922 he went to New York as assistant to the manager of that department. Later he moved to Mansfield, Ohio, and in 1927 he was returned to East Pittsburgh in an executive position and later was made assistant to general works manager, from which position he steps into his present appointment.

Kron Co., Bridgeport, Conn. automatic dial scale manufacturer, has appointed distributers: Ebbert & Kirkman Co., 321 Brown-Marx Bldg., Birmingham, Ala; William N. Schwab, 783 E. 17th st., Los Angeles, Cal.; Coe-Mantes Scale Co., 420 Market st., San Francisco.

Haveg Corp., Newark, Del., has appointed John Beard, as mid-west representative for the new resinous equipment which the corporation is producing. Mr. Beard is making his headquarters in Cleveland.

L. J. Zoeller, in charge of safety and public relations, P. & G., has been elected chairman of the Soap Manufacturers Safety Council, recently formed in Hamilton County, Ohio.

C. M. Connor, Glassine Paper, West Conshohocken, Pa., has been accepted by Joint Committee on Approved pulp testing chemists, and is listed as an approved mill pulp testing chemist.

Veteran Retires

Christian Breevort Zabriskie, 50 years an outstanding character in the peculiarly American borax field, retired officially on Aug. 1 because of ill-health, from his position as vice-president and general manager of Pacific Coast Borax.†

Mr. Zabriskie's decision to retire was made while he was at Soboba Hot Springs, San Jacinto, Cal., where he is taking the hot springs baths to relieve a rheumatic condition. Mr. Zabriskie decided to terminate his official activities with the company, though he will continue to maintain an interest in the company's affairs as an advisor and also financially.

J. C. Fox, chief chemist and metallurgist, Doehler Die Casting has changed his headquarters from N. Y. Office to the Toledo, Ohio Plant of the company where the executive offices are now located. He will continue in the duties as at the present.

Association News

Philadelphia section, A. C. S. announces election of the following officers for the coming year: Chairman, H. M. Weir; Vice-chairman, P. E. Rollhaus; Secretary-treasurer, Lyle L. Jenne; Executive Committee, J. H. Graham, Carl Haner, and A. G. Peterkin, Jr.

Officers of the A. C. S. Chicago Section for 1933-34 are: Chairman, Lee F. Supple; By-Laws, W. R. Smith; Continuation Courses, Arthur Guillaudeu; Employment Committee, Ellery N. Harvey; Endowment Committee, R. C. Newton; Finance, A. B. Carter; House, L. W. Van Doren; Program, J. C. Morrell; Public Representation, Gustav Egloff; and Policy, W. V. Evans.

Fall meeting of the N. Y. Group, Rubber Division, A. C. S., will be held Oct. 6. Chairman of the Program Committee, Bruce R. Silver, N. J. Zinc, 160 Front st., N. Y. City.

*Mr. Albright succeeded in the parks position another prominent chemical executive, the late Stephen B. Mather. Cleveland Cliffs Iron (methanol, acetate of lime, etc.) was and still is one of the leading Mather properties.

†C. B. (as he often signed himself) shares with the late picturesque "Borax" F. M. Smith honor of being most responsible for the building up of the borax industry of the West. Mr. Zabriskie was one of the early developers of Tonopah; he was one of six men to grubstake Stimler and Marsh, co-discoverers of Goldfield. He entered the borax industry as a superintendent of the Pacific Coast Borax plant in 1885 (Company was organized by Smith in 1872). In 1914 Mr. Zabriskie became vice-president and general manager. Smith's path led downward, that of Zabriskie up; "Borax" Smith finally after sitting upon a $20,000,000 financial throne was forced to abdicate control of his borax properties and was declared a bankrupt. (CHEMICAL MARKETS, Dec., 1931, p. 568, "And In Those Days, Giants roamed the Earth."

Foreign

British Hydrogenation

Sir Harry McGowan, I. C. I., chairman and managing director, states that in view of proposed government support in connection with production of oil from coal, directors have authorized erection of a large commercial plant at Billingham on Tees, County Durham, where special facilities are available.

An initial output of 100,000 tons annually of first grade petrol is planned by processing 400 tons of coal daily.* Output from 1,000 tons of coal daily is planned ultimately. Construction is estimated to take one and a half years. Necessary new capital of about £2,500,000 will be furnished by the company from its own resources, which are ample for the new enterprise and for general business of the company.

Addressing meeting of the Central Council of the Works Council Scheme, I. C. I., in London recently, Sir Harry McGowan stated that he was not dissatisfied with results of the first five months of 1933. Although earlier in the year company's sales, particularly of heavy chemicals, had not been up to expectations over April and May, there has been a regular and steady improvement. Sales of lime in the month of March had created a record, he pointed out.

I. C. I. headquarters in London is adorned with stone sculpture groups which have won for their creator, Sargeant Jagger, medal of the Royal Society of British Sculptors.

I. C. I. is negotiating for the acquisition of Chemical Metallurgical on the basis of an exchange of shares.

British View on Plastics

Dr. Herbert Levinstein (famous British chemical industrialist) at a dinner ending the annual conference of the British Society of Chemical Industry predicted that softwood supplies from North America would be exhausted in the lifetime of living men.†

Said the learned British chemist: "Consumption of wood exceeds the natural increment," and the growth of the consumption of wood for building purposes will have to be curtailed to guarantee supplies for the more important purposes of pulp for paper, plastics, and artificial silk. The fact that the greatest reserves of soft wood at the present time are in Russia is likely to have an important political effect in the future.

"I confidently predict that plastics will take the place of wood for floors, furniture, and doors, and that plastic materials will be used for decorative purposes, and even in airplanes, ships, and theaters."

U. K. Chemicals in Canada

J. Davidson Pratt, general manager of the Association of British Chemical Manufacturers, told an audience of chemical men in Montreal on July 1 that British chemical industry was well satisfied with the deal made at the Imperial Economic Conference last year.

Said the popular and well-known British chemical representative: "Don't imagine that the British chemical firms are asleep to their opportunities in Canada. I know that within the last few months no less than five directors of British companies have been over here making contacts and surveying the field. The only other factor that has stopped our firms from sending over larger quantities of their products is that up to the present there has been no list available of the chemicals manufactured in this Dominion, and our people were reluctant to take the chance. The list will be ready presently, and then our people will know what to do."‡

The 42nd Chemists' Exhibition, organized by the "British & Colonial Pharmacist" will be held Sept. 25-29 in the New Hall of the Royal Horticultural Society, Westminster, situated in the centre of the West End of London.

In Great Britain, 27 new chemical factories started up in 1932, five were enlarged, and eight closed down.

French Chemical Trade

Chemical and allied products foreign trade of France so far in 1933 shows a somewhat different trend than that of its leading competitors, inasmuch as imports valued at approximately $26,000,000 for first four months of the current year exceed imports of corresponding period of 1932 by nearly $2,000,000. Exports, however, valued at $17,500,000, are considerably smaller. Increases in imports were spread quite generally throughout the numerous items comprising the chemical trade, but some of the most important classes to record large quantity gains were copper sulfate, potassium carbonate, titanium pigments, coal-tar pitch, tartaric and citric acids, urea, synthetic resins, carbon black (the bulk of which comes from U. S.), phosphate fertilizers except basic slag, phosphate rock, sulfur, and pyrites. Comparatively few export items advanced but, of these, prepared medicines declined slightly in quantity exported but advanced $200,000 in value to a total of $3,000,000 shipped in the first four months of 1933. Synthetic perfumes improved slightly in both quantity and value, to nearly $250,000, but other perfumes and toilet preparations dropped from $2,200,000 to $1,800,000.

I. G. (Germany)

Berlin report states I. G. has witnessed a considerable increase in domestic sales in the second quarter of 1933, but a decline in exports due to competition from depressing currencies.

I. G. which was making experiments with a new moth repellent, has now decided to give up production of this material. Cost of sodium selenate which was to be used in the product is too high to permit manufacture of an insecticide with even a small content of this chemical in competition with the numerous low-priced preparations now on the market.

I. G. has added to its list of synthetic waxes "I. G. Wax V," which is claimed to possess a remarkable degree of solubility in turpentine and petroleum hydrocarbons. Solutions of 15 and 20% may be made at room temperatures without sediment or clouding. At lower temperatures crystinization or gelatinization sets in, but on placing the solution in warmer air it clears again.

Chinese Alkali

Cabled reports state that a contract was recently let for building a small caustic soda plant in Canton. No data is available on the volume of trade in alkalies in the Canton district, but it has not heretofore been reported as an alkali producing centre. Total Chinese consumption of soda ash is estimated by leaders in the trade at 200,000 tons a year, of which imports would account for about one-fourth. Caustic consumption, assuming no local output, would be indicated by imports which were about 13,000 metric tons annually in recent years. In addition to the ash production in Manchuria, soda ash is made by modern methods in Tientsin, North China.

Japanese Dept. of Commerce and Industry has had under consideration plan for greater control over important industries, including fertilizer trade. It is proposed to exercise control over prices of fertilizer materials and to regulate exports for the purpose of safeguarding Japanese markets abroad by preventing undue criticism of Japanese export practices.

Gum arabic and cobalt metal, not including alloys of cobalt, have been placed on the free list for importation into United Kingdom, by a treasury order effective July 14.

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*Proposed plant will deal, however, with only one quarter of 1% of the British annual output of coal. A plant for 100,000 tons of petrol represents but 1-30 of the British imports of petrol. Government subsidy was violently opposed by British capital invested in Persian and other foreign oil fields and mildly by those interested in low temperature carbonization.

†Dr. Levinstein was formerly managing director of Levinstein, Ltd., and British Dyestuffs. He is a past president of the Society of Chemical Industry; also Society of Dyers & Colorists, British Association of Chemists. Clubs: Royal Thames Yacht; Manchester Constitutional; Manchester Literary & Philosophical Society. Hobbies: Hunting, fishing. He with the other famous Jewish British chemical industrialist, Lord Melchelt, and Sir Harry McGowan, managing director of I. C. I., forms the triumverate of the British chemical executives most widely known in this country.

‡Mr. Pratt arrived back in England July 10.

Palestine Potash (British hope of potash independence) is again increasing production. Bromine plant was completed in February 1931 and muriate plant early in 1932.*

Under the "Blue Eagle"

Chemical factory employment in U. S. increased 2% during June. Volume was almost 14% larger than that in June, 1932. Payroll totals increased almost 6% in comparison with May and stood about 7% above June, 1932, level.

Index number of the Bureau of Labor Statistics for factory employment in the chemical industries was 78.9 for June (100=monthly average for 1926), compared with 77.3 for May and 69.3 for June, 1932. Bureau's index number (same basis) for factory payroll totals in these industries was 64.5 for June, compared with 61.1 for May and 60.4 for June, 1932.

Employment and wages in the chemical industry remained well above the average in June, although the increase from the preceding month had been greater for manufacturing in general, and only in employment did the chemical industries stand above the average in comparison with June, 1932.

Employment

	June 1933	*May 1933*	*June 1932*
Chemicals	94.3	88.4	83.6
Cottonseed, oil, cake, and meal	29.1	23.2	23.8
Druggists' preparations	67.0	66.2	70.5
Explosives	75.4	75.0	71.3
Fertilizers	44.3	67.2	32.5
Paints and varnishes	76.4	71.6	72.3
Petroleum refining	64.7	63.6	64.7
Rayon and related products	154.9	147.0	93.4
Soap	99.5	95.8	95.7

Payroll Totals

	June 1933	*May 1933*	*June 1932*
Chemicals	69.1	63.7	61.6
Cottonseed, oil, cake, and meal	30.5	22.0	26.0
Druggists' preparations	66.1	63.1	70 6
Explosives	51.2	46.9	45.5
Fertilizers	27.9	36.8	25.1
Paints and varnishes	62.3	57.9	61.8
Petroleum refining	54.6	53.7	59.4
Rayon and related products	130.1	117 8	78.3
Soap	83.2	78.8	90.5

And in N. Y. State

Employment in factories in N. Y. State, manufacturing chemicals and related products, increased 2.2% between middle of May and the middle of June. Employment in these lines in N. Y. City increased 3.6%.

	June compared with May (percentages)	
	State	*City*
Drugs and industrial chemicals	+6.3	+5.7
Oil products	—1.8	+0.4
Paints and colors	+7.3	+8.0
Photographic and miscellaneous chemicals	+1.1	+0.7

*As far back as 1840, British Admiralty sent an expedition to investigate Palestine properties. Molineux organized one in 1847, American government one in 1848; well-known geologist, Dr. M. Blankenhorn, undertook, in 1908, a scientific exploration under the auspices of Sultan Abdul Hamid II. All these expeditions had a purely scientific purpose.

According to State geologist S. G. Blake, Dead Sea will in course of time place Palestine in the foremost rank of the potash and bromine producing countries. Under present working agreement ultimate production of at least 100,000 tons, will give Palestine an export value in potash of over £1,000,000.

†E. C. Klipstein (not to be confused with a former Cyanamid purchase—A. Klipstein & Co.—is also a large factor in aluminum chloride, anhydrous, market. Kenneth Klipstein remains with the company.

Company News

Calco (Cyanamid subsidiary) has purchased plant and business of E. C. Klipstein and Sons Co. of South Charleston, W. Va., whom they have heretofore represented in the sale of their dyestuffs. The Klipstein company has been producing sulfur black since 1916 and has been a leader in the development of the synthetic anthraquinone process.†

New Wood Flour Supplier

Lumber Bi-Products, 702 M. & T. Bldg., Buffalo, N. Y., has enlarged activities by establishing a wood flour division, recently purchasing the assets of former New England Mills at Manchester, N. H. Plant covers 6.5 acres. There are two railroad sidings to accommodate 12 cars of raw material and 8 cars of finished product at the same time.

Present production approximately 1500 tons per month of various grades. Wood flour is finely pulverized wood, which is refined into several grades and is used as a cheap filler in numerous formulas to replace more expensive ingredients. Samples will be sent gratis, upon request. M. J. Watson, president, has been associated with the wood flour manufacturing industry since 1920, and is familiar with the grades desired by the diversified industries.

Pressure Lubricants

Growing popularity of clear-type, semi-fluid pressure gun lubricants for over-all automobile chassis lubrication is pointed out in a technical service bulletin which Metasap Chemical, Harrison, N. J., is distributing to lubricant manufacturers. Company manufactures two bases which are used in the manufacture of such lubricants—Metasap 537, a body builder, which is a form of aluminum stearate modified to permit pouring the hot grease direct from kettle to container and Metavis 543, which imparts any desired degree of stringiness to the finished product. Neither of these bases alter the color, clarity, and transparency of the original oil from which the lubricant is compounded.

Anticipating speedy conclusion of America's 13 year "Noble Experiment" Canadian liquor giant—Hiram Walker—Gooderham & Worts, Ltd., will spend $1,500,000 for 100,000 gal. a day whiskey plant at Peoria, Ill. Tract of 15 acres has been acquired and plans call for world's largest distillery.

Penn Maryland Co., jointly owned subsidiary of U. S. I. and National Distillers has completed arrangements for handling entire output of Fleischmann's distilling plant, owned by Standard Brands, Inc. Fleischmann plant formerly was a leading gin producer.

Philgas Co., liquefied petroleum gas marketing subsidiary of Phillips Petroleum, has opened a new divisional sales and engineering office in Philadelphia. Company is augmenting industrial division staffs in other offices. Sales of butane and propane in April, May and June were the largest in any three months of the company's five-year history, according to President G. G. Oberfell.

Givaudan Delawanna, has a new product, "Castoreum Synthetic." Product makes its appearance upon the market at a time when castor pods are in small supply and expensive.

Article was developed in company's laboratory abroad. It is reported to have the following advantages over the natural material: obtainable in unlimited quantities; no pronounced coloration; low and stable in price; substitute for the natural product in many instances, and moreover can be employed in creams, soaps and face powders; on account of its chemical composition this product greatly retards rancidity in soaps.

Hercules has installed a new Littrow type spectrograph at the Company's research and experiment laboratories. New instrument, built by Bausch and Lomb, represents latest development in spectroscopy, having a spectrum 700 mm. long and a range of from 2100 to 8000 Angstrom units. It will replace an older type instrument of limited field. Hercules research officials expect the new spectrograph to be of value in the study of lacquer film deterioration, ammonia oxidation catalysts, absorption processes in naval stores, and in all forms of quantitative and qualitative analysis.

New Mellon Fellowship

Buromin Co., Pittsburgh, Pa., which has made wide application of molecularly dehydrated phosphates of the alkali metals in water conditioning and washing, has founded an Industrial Fellowship at Mellon Institute for the purpose of investigating broadly the properties of these chemicals and of extending their uses in the industries, in medicine, and in the home. Special attention will be accorded to "Calgon," which is essentially sodium metaphosphate. Dr. Bernard H. Gilmore, who has been selected as the incumbent of this Fellowship, started his research program on June 15.

Reversing trade-mark examiner, Commissioner of Patents ruled July 17 that Atlantic Refining, Philadelphia, is entitled to register "Atlantic Safety Kleen" as a trade-mark for a dry-cleaning fluid.

Brown Co., Portland, Me., has just issued the first issue of "The Solka Age" a well illustrated magazine devoted to telling the many uses already developed for Solka-name given to the Brown Co.'s new highly purified Alpha cellulose fibre. Many variated uses are mentioned running from Solka base roofings to uppers for women's shoes and molded products.

Germicide Products, Buffalo, has been chartered at Albany with capital of $50,000 to manufacture germicides. William C. Warren, Jr., Aurora, N. Y., and Wm. G. Shoemaker, Jr., 15 Middlesex road, and Gibson Gardner, 232 Lincoln Parkway, Buffalo, were named as directors.

Scholler Bros., Inc., manufacturer of soaps and finishing commodities, has awarded a contract to William F. Lotz for construction of a new warehouse to occupy an entire city block and comprise 57,000 sq. ft. of floor space. New unit will have facilities for storage of 250,000 gals. of liquid products. Present manufacturing capacity of firm's plant will be increased 100%.

Adeloda Mfg., organized in Buffalo, with a capital of $20,000, to operate a plant specializing in cleaning fluids. Principals: Edward D. Delong, Ludwig Dollhopf and Wm. F. Schohl.

Ultrex Products, 150 Causeway st., Boston, and with a new plant at Everett, Mass., is a new company in the industrial cleaning materials field. President of the company is Harold L. de Trembicki. Company also maintains N. Y. City offices at 50 Church st.

Quaker City Chemical Products Conshohocken, Pa., has raised the wages of its factory and office employes 10% and at the same time instituted a 40-hour week.

Buffalo Electro-Chemical, Boston, has leased first story of the building at 207 and 209 A st., South Boston.

Colgate-Palmolive-Peet Co. has acquired a 51% interest in Compania Nacional de Perfumeria S. A., Havana, Cuba. Transaction involved a cash expenditure of less than $200,000.

Industrial Chemical Sales opened a Columbus,Ohio, branch at 370 W. Broad st., July 9 in charge of Richard N. Stathan.

Du Pont has issued new sample card of PX Cloth 3 Color 1096 solid (black) showing new grains and finishes available. Copies obtainable from Fabrikoid division, Newburgh, N. Y.

Go-West Co., Seattle, Wash., has been organized by F. S. Coyne and J. M. Gilman for the manufacture of insecticides.

American Bleacher Products, Detroit, has completed a perfumed bluing for washing cloths. It may also be used as a writing fluid.

Sylvania has added 60 to its staff, increased wages 5%, and has stepped up production to 24 hours a day.

Richards Chemical Wks, Jersey City, N. J., has prepared folder describing six new oil bases for polishes.

Goodyear plans construction of a $500, 000 steam-power plant at Akron.

Solarine Co., Baltimore, has developed a non-inflammable insecticide "P.D.Q."

Chemical Solvents, N. Y. City, is located at 11 Park place.

Heveatex-Latex-Expands

Growing demand for latex (liquid rubber)† has made it necessary for Heveatex Corp. to add 50,000 ft. of floor space to their plant at Melrose, Mass. This expansion was designed to assure manufacturers of a constant supply of normal, concentrated and processed latex at all times.

Of unusual interest at this time is the announcement of a new departure by Heveatex whereby their specialized facilities and experience are available for working out through all the experimental stages, complete development projects utilizing latex. Completed process is delivered to manufacturers ready to set up for production. For the development of new products or for the improvement of old products, this new arrangement offers exceptional opportunities. Branch offices are maintained at N. Y. City, Akron and Chicago.

Newcomers

Naturalik Chemical Mfg., Indianapolis, Ind., formed to manufacture cosmetics, "Nu-Paks" a cream and applicator combination is a new product just put out on the market by the American Advertised Products, Chicago. Formica Insulating, 4628 Spring Grove ave., Cincinnati, has a new product called Formica Falling, for metal or pressed boards, It is said to be stain-proof, acid-resisting, and warp-proof. Milton Chemical has been organized at Milton, Pa., to manufacture complete line of cosmetics. American Chemical Products, 42 Pine st., Brooklyn, N. Y., is about to market a new non-evaporating soldering flux under the brand name Tru-Flux. New uses are being developed for Vermiculite a peculiar mineral which expands to 16 times its size, and unfolds into worm-like forms when heated, by Zenolite Corp., Libby, Mont. Bureau of Mines has just issued an information circular on the material.

Brooklyn College (College of the City of N. Y.) is offering course on "The Principles of Electrochemistry and Photochemistry" by Dr. Dwight K. Alpern.

du Pont N. Y. Estate

T. Coleman du Pont's N. Y. County estate, who died Nov. 11, 1930, aged 66, was estimated $17,540,642 in a transfer tax appraisal just filed.* At the seme time an appraisal of the Westchester du Pont estate fixed the value at $2,270,582, according to the Westchester Surrogate's office. Total value of the du Pont estate was estimated at about $100,000,000 when the will was filed for probate in Delaware.

Wallboard Suit

U. S. District Court of Appeals, Philadelphia, has reversed U. S. District Court of Delaware in its dismissal of suit by Masonite, against Celotex and ruled that Celotex had infringed a patent owned by Masonite for production of "hard board" from the waste products of saw mills. Court decided Celotex's "hard panel board" infringed Masonite's "Prestwood" product.

Customs Rulings

U. S. Customs Court holds, Genesee Button v. U. S. that "a commodity in the form of a powder which the record shows contains both the red and white blood corpuscles, held to be classified as blood, dried, not specially provided for, and free of duty under paragraph 1624 of the Tariff Act of 1930, rather than dutiable at 6c per pound under paragraph 701 of the same law as dried blood albumen, ***dark."

Piperidin has been held by the U. S. Court of Customs and Patent Appeals to be dutiable under the provisions of par. 27 of the tariff act of 1930, at 7c per lb. and 40% ad valorem.

Article imported by Charles Hardy, Inc., had been classified by collector as dutiable under par. 27, and this classification was upheld by U. S. Customs Court. Importer claimed that the duty should be 25% ad valorem under general provision for chemicals, basing his claim on the fact that piperidin, chiefly used as an accelerator of rubber vulcanization, is derived from pyridin, which is entitled to free entry. This, it was alleged, removed piperidin from the application of par. 27. Case was argued on appeal early in February.

Sodium in Tanks

Du Pont has placed an order with General American Transportation for six special tank cars to carry metallic sodium. It will be the first time this chemical, a true metal of wax-like consistency, has been shipped in tank cars. Cars will be unusually large, having a capacity of 11,000 gals. At present metallic sodium is shipped in 50-gallon drums.

New Zealand exports of kauri gum dropped further last year, 1932 figure being 2,078 tons, after the 3,019 tons of 1931 and the 3,653 tons of 1930.

*T. Coleman du Pont was a Senator from Delaware for many years, president of the du Pont Co. from 1902 to 1915. In the latter year he sold his holdings to a syndicate headed by his cousin Pierre, present chairman of the board.

†See CHEMICAL MARKETS, Dec., 1932, p. 513 for a review of liquid rubber or latex markets, possibilities, etc.

Chemical Fads and Fancies

Dr. Robert E. Wilson, vice-president of Standard Oil of Indiana, is general chairman of a committee to make plans for the 86th A.C.S. meeting at Chicago beginning Sept. 10.———The sharp rise in some of the large fertilizer stocks was attributed by The Wall St. Journal's Broad Street Gossip to the possibilities NIRA held open to the so-called "big fellows." Says the "Gossiper"—"For a decade past this industry, once one of the most substantial in the country, has suffered from trade "pirates," that is, small mixers with small overhead have been cutting prices . . . etc.,"———Well we never heard them called that refined name before, but at least our leading financial daily knows what's wrong, which is sump'in'.———Col. J. J. Riley (Barium Reduction's head) is back after an extensive Canadian trip.———A writer in the *Journal of Chemical Education* figures that of the R-substituted derivatives of triphenylmethane alone, more than 8,000,000,000,000,000, compounds might be prepared. We are glad after all we are living now. Just think of editing the CHEMICAL GUIDE-BOOK when all those become commercial.———Monsanto's DuBois is abroad and does not plan to return until September.——— Cyanamid's Landis was in Mexico in July. That's no time to go touring there.———George F. Hasslacher is a director in Young & Co., new firm of investment counsellors and managers of investment funds.———Samuel H. Bell (Koppers Products) and Mrs. Bell sailed recently for a three months European trip.———A suitable marking of the grave of Dr. Abraham Gessner, inventor of kerosine, will be placed shortly in the Camp Hill cemetary at Halifax, Nova Scotia.———U. S. I.'s Backus has moved from South Orange, N. J. to Stamford, Conn.———Benjamin H. Brewster, Jr., president of Baugh & Sons Co., The Baugh Chemical Co., and other allied companies, has been elected president of the Baltimore Union Trust Co.——— Quite a furore has been stirred up over the recent report that sodium nitrite is a fatal poison.———Mathieson's Gage is away ill and will probably not return until the middle of August.———Fruit juice has an affinity for green, an agricultural experiment worker reports. Which proves what? That Irish bartenders are better? Seriously he points out that green bottles have better keeping qualities than other colors.———Industry will miss C. B. Zabriskie (Pacific Coast Borax) retiring after 48 years in the thick of the "Death Valley" battles.———Charles V. Bacon, consulting engineer specializing in oils, is now County Commander of the Bergen County, N. J., American Legion. ———Charles J. Brand, co-administrator with George N. Peck (Agricultural Adjustment Act) will hand out close to $90,000,000 to farmers for acreage reduction.———Leonard W. Cronhite of Leonard W. Cronhite, Inc., Boston, and Miss Beatrice V. Brown, dean of Radcliff College, were married July 21.———A large part of the "Who's Who In The Industry" was at the historic Biltmore meeting Aug. 3.———The Westwego, La., U. S. I. plant, was the only small unit to attain a perfect accident rating in 1932. ———Another startling resignation is that of Sid Klein, U. S. I. Vice-president. Like Zabriskie in borax, Klein has been a prominent figure in the alcohol picture for years. Klein tendered his resignation in order to become an independent broker and dealer in the whiskey warehouse receipts.———Willard L. Thorp, Amherst economics professor, is the new head of the Bureau of Foreign and Domestic Commerce. He has in the past contributed several articles to CHEMICAL MARKETS. ———The cheapest "buy" at the moment is $10 invested in the Chemical Alliance. ———British Society of Chemical Industry has elected Dr. J. T. Dunn, president.———Harvard Assistant Chemistry Professor, Henry E. Bent, lectured in the Mallinckrodt Chemical Laboratory July 20 on "A Century of Progress in Science." ———B. F. Howards, managing director of Howards & Sons, Ltd., Ilford, near London (fine chemicals and now solvents and plasticizers) is a new member of the British Pharmacopoeia Commission.——— The I. G. Frankfurt dye works was visited by fire early in July but no official report has been made of the damage.——— Harry I. Peffer, Chairman of Rossville, stated during the month that no final plans had yet been released regarding the future activity of the company. Plants retained in Commercial Solvents' deal are suitable for whiskey production.——— F. M. Becket, president, Union Carbide & Carbon Research Laboratories, and a CHEMICAL MARKETS consulting editor, is a contributor to the "Book of Stainless Steels." His particular field is "Alloys Containing Considerable Manganese." ———Jones and Hare, the old "Happiness Boys" are now on the "air" for Swan-Finch Oil.———Jewish Olympic Games have been cancelled by the Roumanian government because of a plot against the lives of Lord Melchett and other prominent Jewish men who were to have attended as guests of honor.———H. C. Peters of Thurston & Braidich, and Mrs. Peters were in the West Indies in July.——— William D. Gray retuned August 11 on "Aquitania."

N. Y. State Freight Rates

N. Y. P. S. C. has approved reduced freight rates of the Long Island on corn, cocoanut, cottonseed, palm kernel, peanut, soybean and sunflower seed oil, carloads, minimum weight, as per tariff, from Long Island City to Corona 5c per cwt. being a reduction from class rates, effective Aug. 7.

Some authority has approved new freight rates of N. Y. C. (East) on caustic carloads, minimum weight as per tariff, from Syracuse and Solvay to Lockport on the Erie 13½c per 100 lbs., being a reduction from class rates, effective July 22.

Also the same authority approved new freight rates of N. Y. C. (East) on caustic potash, in drums, carloads, minimum weight 36,000 lbs., and in tankcars, minimum weight as per rule 35, from Solvay and Syracuse to stations at Depew and Black Rock, inclusive, 13.5c per 100 lbs., being a reduction of 2c per 100 lbs., effective August 1.

Another announcement approved new freight rates of the N. Y. C. (east) on sulfur dichloride, carload, minimum weight in drums 40,000 lbs. in tank cars as per Rule 35 from Black Rock, Buffalo, Niagara Falls, and Suspension Bridge to New York, Brooklyn and vicinity, 25c per 100 lbs. Reduction from class rates, effective Aug. 12.

Commission has approved cancellation by D. & H. of commodity rates on alum and sulfate of alumina, carloads, minimum weight 40,000 lbs., from Albany, Green Island, Troy, Corinth, Fort Edward, Glens Falls, Delano Junction, and Ticonderoga to various local stations, rates per 100 lbs. ranging from 6 to 10c; class rates restored; increases effected; effective August 1.

Du Pont Viscoloid organization changes include appointment of L. R. Blackhurst as general manager of the Pyralin Products Dept., succeeding D. F. Carpenter, who has been transferred to Remington Arms. Mr. Blackhurst has been director of sales of the Pyralin Products Dept. He is widely known, having been in charge of sales of various activities of Du Pont Viscoloid for many years.

W. D. Ward, sales manager of the Toiletware Division, has been appointed director of sales of the Pyralin Products.

Important Price Changes in Tanstuffs

	June 30	July 31
ADVANCES		
Albumen, egg	$ .81	$ .82
Cutch, Philippines	.02½	.02¾
Divi-divi	27.00	30.00
Logwood, extract, crystals	.14	.18
Mangrove bark	26.00	26.50
Myrobalans, J I	30.00	32.00
Quebracho, solid	.02¾	.03
clarified	.02⅞	.03⅛
Sumac, Sicilian, ground	54.00	63.00
42°	.05	.05¼
51°	.06	.06¼
Wattlebark	30.00	36.00
DECLINES		
Valonia, beards	36.00	35.00

Heavy Chemicals

Thom-Phosphate Institute Head

Sodium Phosphate Institute, Inc., has been formed by leading manufacturers of phosphate of soda to promote a more comprehensive relationship between those engaged in the production and the larger consumers of these products.

Considerable research work will also be done by the organization for the purposes of developing new outlets for the material.

Organization is headed by William B. Thom, Warner Chemical. Other officers are George A. Bennington, Bowker, vice-president, and Robert T. Baldwin, secretary and treasurer. Headquarters of the institute are located at 50 E. 41 st., N. Y. City.

Prices Rise in July

Consumption of heavy chemicals in July was very satisfactory, although the total volume did not reach June figures. It is pertinent, however, to point out that the movement continued against the seasonal trend, which is usually sharply downward in July. A number of reasons contributed to the slight slackening of the pace, aside from annual "summer dullness." In the first place, it is quite obvious that more than a modest portion of the spirited buying in May and June represented anticipated needs in fear of much higher price levels. Some hesitancy is likewise appearing as to what the final effect the intense N. R. A. drive, initiated by President Roosevelt's stirring radio address, will have on costs—materials as well as labor. As might be expected the wave of production has left some stocks that remain to be worked off. Another adverse factor was that of labor disturbances in the textile centers.

Important Price Changes

ADVANCED	June 30	July 31
Antimony, needle	$ .07	$ .08
oxide	.07½	.08½
salt	.20	.22
Arsenic metal	.25¾	.31
Arsenic, red	.11¼	.13
Barium floride	.12	.15
Copper sulfate	3.50	3.75
Corn syrup 42°	2.73	2.88
Corn syrup 43°	2.78	2.93
Dextrine, British gum	3.54	3.89
corn canary	3.29	3.64
white	3.24	3.59
Feldspar, Maine, pottery	14.50	15.50
Feldspar, N. C., pottery	14.00	15.00
Glycerine, dynamite	.08¼	.09
Magnesium silicofluoride	.08¾	.10
Magnesite, cal	46.00	50.00
Manganese sulfate, anhyd	.08	.09
Niter cake	10.00	12.00
Potassium carb. 80-85%	.05¾	.06¾
96-98%	.06⅝	.07⅝
Hyd. 83-85%	.06	.07
Potassium, permanganate	.16	.17½
Sodium bisulfite	2.75	3.00
Sodium stannate	.30	.30½
Starch, corn pearl	2.39	2.74
potato, dom	.03¾	.05¼
rice	.07	.07½
wheat	.05¾	.06¼
Tartar emetic, tech	.20¾	.21¾
Tin, crystals	.34½	.36½
oxide	.47	.50
Trisodium phosphate	2.15	2.50
Zinc fluoride	.15	.20
REDUCED		
Zinc dust	.06¾	.06½

Despite these somewhat dampening influences, however, the call for most items remained very encouraging. Glass industry continues to be a very bright spot with the result that ash and caustic shipments held up remarkably well. Paper also continued to show very definite signs of greater activity. Tanning schedules, while slightly reduced, were sufficient to move the best tonnage of bichromate for any month of the current year.† Automobile production is thought to have declined slightly under June but to have held above 200,000 units. Plating chemicals were, however, somewhat quiet. Steel activity showed signs of wavering slightly in the last 10 days but still continued to hold well above the 50% level. Despite labor troubles the textile centers were busy. In Paterson the dyeing trade went to the 40 hour week of NIRA and notices were posted of price increases running from 15 to 35%. The natural result was a stimulation of last minute orders.

Outstanding in the month's price changes were higher levels for starch, dextrine, corn syrup. These were made previous to the bad break in the grain market, but nevertheless it was felt in many quarters that the advances would hold. The metals were, of course, affected by the downward plunge in the stock and commodity markets and closed off the month in most cases at prices below the high. For this reason the number of changes in prominent metallic salts did not reach the number reported in June. Higher prices for antimony did cause several important upward price revisions, and the copper sulfate producers announced early in the month an additional ¼c advance. Of more than passing interest was the firmer position of trisodium. The glycerine market both locally and in Chicago was stronger and sentiment seems to be favorably inclined toward higher prices shortly.

*In 1932 Texas produced 82.6% of U.S. black production (177,369,000 lbs.) Leading producers: Samuel Cabot, Boston; Columbian Carbon (selling agents for Binney & Smith and others) N. Y. City; United Carbon, Charleston, W. Va., Century Carbon (Wishnick Tumpeer) N. Y. City. Carbon black industry reviewed in May issue, p. 419.

†Spot cars rose to 5c at the end of July.

Carbon Black News

Following advice from Texas Attorney General's department, Railroad Commission has refused petition of a west Texas natural gas company (Panhandle Section) for permission to utilize 50% of the open flow from its gas wells in the manufacture of carbon black. Attorney General held that not more than 25% of the open flow from gas wells can be used for any other purpose than for fuel and light.*

Calgary $1,000,000 carbon black plant plans (Turner Valley field) have been abandoned because of too few users in the district. Those under contract are being released.

Import statistics of France for the first four months of 1933 indicate that total receipts of carbon black were 59,685 metric quintals as compared with 28,102 metric quintals imported for the corresponding months of 1932. Practically entire quantity was shipped from U. S.

Borax Mining Claims

United States Borax Co., a West Virginia corporation, has obtained from Western Borax Co., Ltd., a 480-acre plot comprising three mining claims near Kramor, Kern county, Cal. Sale called for $700,000. A trust deed, filed at the same time called for the payment of $535,000 in semi-annual installments of $35,000 each. Trust deed was guaranteed by Pacific Coast Borax.

Bacon Patents

Twenty-one patents covering chemical processes have just been awarded to Raymond F. Bacon.

For six of them he had applied to the Patent Office at Washington with Henry T. Hotchkiss, Jr., for another six with

Statistics on Calcium Acetate and Methanol*

Methanol (Gallons)

	1931 May	1932 May	1933 April	1933 May	Total 5 mos. (Jan.-May) 1931	1932	1933
Refined—							
Wood distillation—							
Production	118,052	71,668	82,846	95,365	1,102,099	580,696	585,393
Shipments	245,628	76,404	105,559	105,578	979,701	431,443	454,816
Stocks, end of mo	448,440	298,704	358,965	348,752	......	......	......
Synthetic—							
Production	784,108	742,826	425,333	366,015	3,733,793	2,890,670	1,646,855
Shipments	344,229	349,034	576,646	761,369	2,146,278	2,041,835	3,141,982
Stocks, end of mo	2,683,555	2,727,442	2,110,901	1,715,547	....	....	....
Crude—							
Production	247,808	243,089	174,201	184,921	2,099,122	1,255,366	1,196,493
Shipments	*......	*......	190,485	203,336	*......	*......	1,171,861
Stocks, end of mo	616,358	541,533	271,914	253,499	......	......	......

Acetate of Lime (Pounds)

	1931 May	1932 May	1933 April	1933 May	Total 5 mos. (Jan.-May) 1931	1932	1933
Production	2,652,982	3,251,609	2,438,358	2,518,759	29,441,077	17,416,136	17,239,317
Shipments	5,658,338	3,054,402	3,261,955	4,366,881	23,997,068	20,108,194	13,774,338
Stocks, end of mo	28,073,993	7,136,790	12,448,095	10,599,973	....	....	....

*Data not available.

Rocco Fanelli, and for the remaining nine he was applicant with Isaac Bencowitz.

Thirteen of the patents cover processes for recovering sulfur. Six are for the treatment of iron sulfide-bearing material. Other two embrace a process for recovery of sulfur and iron oxide and production of ferric oxide.

Most of the patents had been pending since February, 1930, and the processes have as many as eleven patentable features. Other three assigned their rights in the patents to Bacon.

Southern Alkali Construction

Excavation work for second building to comprise Southern Alkali's plant being erected at Corpus Christi, Tex., was started on July 22. Building will be known as the drum house and in it will be manufactured steel drums in which company's products will be shipped.

New Companies—New Products

Alex Chemical Manufacturing, L. S. Toomig proprietor, has begun production of liquid bleach at 830 S. Wolfe st., Baltimore. Corporation expects to add other chemicals to its list of products later.

Trestrail Corp., 255 Spadina ave., Toronto, Ont., has started production and distribution of a cleansing, bleaching, and sanitizing solution, "Majeau." Product is being offered in two types "de luxe," for personal sanitation and household uses, and "standard," for general application.

Electric Reduction Sales Co. Ltd., (Canada) is announcing production of sodium and potassium chlorates. Special interest is attached to this announcement because this is a distinctly new venture in Canada. This is the only British Empire source of chlorates, according to Canadian trade papers.

Canada, July 31, placed a 20% duty on potassium chlorate," not further prepared than ground." British chlorate is admitted free; intermediate rate is 15%.

Eastern Silica & Chemical, Winchester, Va., was sold in July by the trustee in receivership to Pennsylvania interests for $2,600. According to the deed of sale, J. G. Miller, of Lewiston, Pa., was the purchaser. Mr. Miller is said to be an official of the Miller Coal & Silica Company of Lewiston. Operation of the plant, which has been idle for two years, will be resumed soon, Mr. Miller stated.

U. S. lost market for ammonia in Jamaica when Great Britain went off the gold standard. Annual consumption approximates 24,000 lbs. There are four consumers, including a cold storage firm which began importing early in 1933.

*See CHEMICAL MARKETS, Sept., p. 235 for a summary of the camphor markets and the tariff. In President du Pont's 1933 annual stockholders report he announced production of synthetic camphor. Sherka in its advertising is now stressing that German camphor is made from American turpentine.

Fine Chemicals

Camphor Rate Unchanged

U. S. Tariff Commission's hearing July 26 on production of synthetic camphor was very brief, as the commission had already ascertained that domestic production during the first half of the year exceeded 25% of consumption, thereby complying with the provision of the tariff act for the duty to remain at 5c per pound.

Representatives of the only producer, duPont were present to answer questions. An importer, Sherka Chemical, N. Y. City, sent a representative Frank Layman. Dr. Ivan Gubelmann, duPont, stated that his company entered the business last winter because prices of camphor fluctuate so widely that consumers desired a stable local supply. Earlier attempts to produce camphor synthetically in this country failed, in his opinion, because not sufficient research was done in preparation. He declared his company has solved the problems, and will continue to produce camphor. V. VanVoorhis of duPont Viscoloid, consumers, explained that manufacturers of pyroxylin plastics and films use practically all the camphor, that for their purposes natural and synthetic camphor are equally good, and that the new duPont synthetic camphor is quite satisfactory.*

Camphor division of Taiwan Government Monopoly Bureau has advised Taiwan Camphor Manufacturing Co., which is the sole producer of camphor in the camphor forests of Taiwan, that a further reduction will be made in prices of the product. According to reports transmitted to the Dept. of Commerce by the consul at Taihoku, monopoly bureau has failed to make a profit on its camphor division during last three years. On the other hand, manufacturing firm has continued to make fairly satisfactory profits, which will be wiped out, it is claimed, if the price of camphor is further reduced.

Prices Go Higher

Advances in the fine chemical market were again largely the result of higher prices for raw materials, due, of course, to the wide fluctuation in the dollar value abroad. Practically all of the important iodides were advanced anywheres from 5 to 25c. Mercury again registered higher prices, closing at $65 a flask, an increase of $4.50 for the 30 day period. Mercury salts were again higher as a result. Another outstanding advance was that made in U. S. P. chloroform to 30c. Producers of domestic tartaric raised the price for crystal to 23½c, as importers were forced to advance quotations due to the dollar fluctuation abroad. Domestic and imported cream of tartar went higher. Bismuth metal price reached $1.10 during the month and caused an upward revision in the subnitrate, subcarbonate, oxychloride, etc. In common with most of the other divisions of the industry some slackening in general demand was noted in the closing days of the month. On the other hand, certain of the seasonal items largely affected by hot weather moved out in exceptionally large quantities as most of the country sweltered in a terrific heat wave.

Important Price Changes

	June 30	July 31
Acid tartaric	$ .22½	$ .23½
Ammonium iodide	4.25	4.30
Arseneous iodide	5.80	6.05
Barium iodide	4.85	5.00
Bismuth, subiodide	3.55	3.63
Bismuth, metal	.90	1.05
subcarbonate	1.25	1.45
subnitrate	1.10	1.25
Brucine, alkaloid	.15	.20
sulfate	.08	.12
Chloroform, U. S. P.	.25	.30
Calcium, iodide	4.30	4.55
Calomel	1.15	1.23
Copper, iodide	5.42	5.62
Corrosive sublimate	.72	.77
Cream of tartar	.14	.16½
Iodine		
resublimed	3.25	3.35
Iron, ammonium oxalate	.25½	.26½
Iron sodium oxalate	.25½	.26½
Lead iodide	2.85	3.00
Lithium iodide	4.95	5.15
Mercury	61.50	65.00
Potash iodide	2.55	2.70
Silver nitrate	.25¾	.26½
Sodium iodide	3.35	3.50
Strontium iodide	3.30	3.45
Tartar emetic, U. S. P.	.20¾	.21¾
Zinc iodide	4.60	4.85
Zinc stearate	.16	.17

British Phenacetin

For the first time since the war, British chemists are now manufacturing acetphenetidin (phenacetin) and hydroquinone. By the use of a new ether extractor recently developed at the chemical research laboratory of the British Department of Scientific and Industrial Research, co-operation between the laboratory and a chemical concern has led to the production in Britain of resorcinol, for the first time on a commercial scale.

Citric Statistics

A loss of 5.3 million lire is reported for 1932 by the "Arenella" Company of Palermo, which is the largest company in the Italian citric acid industry. Position of the company is to be reviewed at an extraordinary general meeting of shareholders to be held shortly. In addition to citric acid, lemon oil, and alcohol, company produces sulfuric, nitric and nitre cake.

Imports of citric acid into France increased to 7,058 metric quintals (3,320,000 francs) in first four months of 1933, compared with 1,703 quintals (1,195,000 francs) during the comparative 1932 period. Inbound shipments of citrate of lime advanced to 1,849 quintals (448,000 francs) from 852 quintals (207,000 francs).

Fine Chemical Exports

Exports of formaldehyde, citrate of lime and miscellaneous synthetic organic chemicals from U. S. during first five months of 1933 all were larger than in corresponding period of 1932, but exports of acetone and carbon bisulfide were less.

Figures in pounds for first five months of 1933 were: formaldehyde, 1,436,000; citrate of lime, 3,767,000; acetone, 1,265,000; carbon bisulfide, 1,072,000, and miscellaneous synthetic organic chemicals, 2,700,000.

Acetylsalicylic Production

U. S. acetylsalicylic acid production amounted to 2,291,000 lbs. in 1932, compared with 2,061,000 lbs. in 1930. Sales in 1932 totaled 2,229,000 lbs. for a total of $1,506,000. Unit value of sales dropped from 77c per pound in 1930 to 67.6c in 1932.

German strontium products factory at Rosslau has been reopened by its owner, the Dessauer Werke fur Zuker und Chemische Industrie.

Solvents

Deal Consummated

Rossville stockholders July 18 approved sale of the industrial alcohol business to Commercial Solvents. Contract provides for sale of Rossville's New Orleans plants, the plant of the California subsidiary and certain of the current and working assets of the corporation and its subsidiaries, including inventories, the consideration being 105,000 shares of Commercial Solvents, stock and cash in the amount of the book value of the current and working assets sold. Assets of Rossville and subsidiaries not covered by the sale comprise principally cash, notes and accounts receivable and plants at Lawrenceburg, Ind., and Carthage, Ohio, and certain other facilities which may be adaptable to the manufacture and sale of alcoholic beverages.*

Commercial Solvents will begin immediate construction of a $190,000 addition to its Terre Haute plant, according to Major T. P. Walker, executive vice-president. Expansion of the plant is necessitated by acquisition of the Rossville, which was recently approved by stockholders of that firm. Addition will be a "breakdown" plant for alcohol manufactured from molasses at New Orleans.

U. S. I.'s New "Super Pyro"

U. S. I. is introducing "Super Pyro 200" which is 200 proof anhydrous denatured alcohol, and for which the company claims six technical advantages over ordinary C. D. 5. It is reported that it stops rust and corrosion, reduces evaporation, has non-offensive odor, contains no water and is hence 100% anti-freeze. Product will retail at a premium above C. D. Special jobber and dealer helps are being planned by the U. S. I. advertising dept.

Important Price Changes

	June 30	July 31
ADVANCED		
Chloroform, tech	$ .15	$ .20
REDUCED		
Alcohol, completely denat No. 5	.38½	.34

Alcohol Industry's Loss

Sid Klein, a U. S. I. vice-president since Kentucky Alcohol merged with the former July 26, 1929, has resigned to become an independent broker and dealer in the whiskey warehouse receipt business. New organization Mr. Klein will head will engage in active business if and when 18th amendment is repealed.† Offices have been taken at 347 Madison ave., N. Y. City.

Well-known alcohol figure for 45 years turns to new field.

C. D. 5 Reduced—Then Raised

Early in the month alcohol producers released the C. D. 5 schedule based on a 32c price for carloads. No differential was allowed as in previous schedules for orders above single cars. This decline represented a cut of 6½c. On July 26 an increase of 2c a gal. was made making the new schedule 34c for carloads and 40c for less than carloads. This upward revision was due partially to high blackstrap prices and also because it was felt that the first reduction had been too drastic. Early in the month some of the producers also announced a 10c advance on all grain alcohols above the molasses figure.

It is said that the demand for anti-freeze, at least for covering contracts, has been greatly in excess at this early period over last year. This has stimulated production at the distilleries. It is felt by a large number of buyers that further price advances may be made, hence the desire to cover at this time.

Quotations for denatured alcohol to be delivered to Jan. 31, 1934, except as noted, are as follows:—

	Cents per gallon
C. D. No. 5 drums, works, car lot	34
5 to 71 drums	40
1 to 4 drums	42
S. D. No. 1, tanks	30.4
drums, car lots	34.6
9 to 19 drums	40.6
20 drums	36.6
1 to 4 drums	42.6
barrels, car lots	37.6
5 to 19 barrels	43.6
1 to 4 barrels	45.6

The petroleum solvents markets had their "ups and downs" in July. An advance of ¼c was made in nearly all of the various solvents in the third week only to be rescinded in the last week, leaving the price structure unchanged as the month closed.

Chloroform, both U. S. P. and technical grades, was advanced sharply on July 18. The new schedule calls for 20c for the 650 lb. drums (technical) and 30c for the same size containers of U. S. P. material.

In the solvents field it is unlikely, according to the views of many important factors, that very many major price changes are possible before the turn of the year. A large part of the tonnage is tied up under contract, it is suspected, until Dec. 31. In the acetates, for example, no price rise has been made, although acetic has been boosted twice in the past three months. The field is still very competitive. Of course on spot business advances are always possible.

In general the demand for solvents held up remarkably well in July, due largely to the continued high rate of activity in the automotive area.

Shipments in Tanks

Tankcar shipments of completely denatured alcohol and proprietary solvents made from specially denatured alcohol No. 1, has again been authorized by Federal authorities. Such shipment is restricted to lots of alcohol or solvents sent direct to manufacturing consumers for their own use and not for resale. New ruling has been sought after for several months.

Official announcement, issued Aug. 2 as T. D. 16 from the offices of the Secretary of the Treasury and the Attorney-General by J. M. Doran, Commissioner of Industrial Alcohol, and A. V. Dalrymple, Director of Prohibition, is as follows:—

*Rossville directors have set Aug. 16 as the last day on which Rossville preferred stockholders may make the exchange of $10 in cash and one-half Share of Commercial Solvents for each share of Rossville preferred.

†Mr. Klein was one of the pioneer organizers of the Industrial Alcohol Institute. He has spent over 45 years directly connected with the whiskey and alcohol field. In addition to being vice-president of Kentucky Alcohol he held a similar position with Kentucky Distillers and Warehouse Co. Kentucky Alcohol was a wholly-owned subsidiary of National Distillers' Products, had plants at Westwego, La., and Peoria, Ill.

Article 117 of regulations No. 3, as amended by Treasury Decisions No. 9, is further amended by inserting after the first paragraph thereof a new paragraph as follows:

"Upon written authorization of the Commissioner of Industrial Alcohol, completely denatured alcohol may be shipped in tankcars to manufacturers for their own use and not for resale."

Article 146 of regulations No. 3 is amended by adding after the third paragraph thereof a new paragraph as follows:

"Proprietary solvents manufactured from specially denatured alcohol, formula No. 1, may be sold by the manufacturers only to users, or to dealers for resale, for solvent or manufacturing purposes, and only in metal packages bearing embossed serial numbers such as prescribed by article III, as amended by the Treasury Decision No. 9, with respect to completely denatured alcohol, and bearing the embossed permit number or symbol of the manufacturer; except that, upon written authorization of the Commissioner of Industrial Alcohol, shipments of such solvents may be made by the manufacturer in tankcars to actual users for solvent or manufacturing purposes and not for resale."

Use of Form A1453-A

On July 24 the Bureau of Industrial Alcohol issued following instructions with reference to the use of form 1453-A in connection with sales of specially denatured alcohol to government agencies:—

Hereafter, denaturers and bonded dealers will, when shipping specially denatured alcohol to U. S. or governmental agency thereof, fill out one copy of this form and forward it to the government officer to whom the specially denatured alcohol is consigned. Upon receipt of the shipment, the government officer will execute the certificate of receipt and forward the form to the Commissioner of Industrial Alcohol, Washington, D. C.

A supply of blank forms 1453-A is being forwarded under separate cover to supervisors of permits for distribution to denaturers and bonded dealers in their districts.

Coal Tar Chemicals

Few Price Changes

Higher monetary exchange rates were largely responsible for the advance in the two grades of cresylic and also the higher quotations for crude naphthalene. The third important price advance of the month was a 50c increase per barrel for coaltar.

Outstanding in the news of the markets was the scarcity of toluol supplies. This is the direct result of consumers building up inventories and the sudden spurt in the automobile field. Despite the increase in steel operations to the neighborhood of 50-60% stocks are not excessive in any of the coaltar groups. Demand continues to balance production quite nicely. Shipments into the Akron tire section were most satisfactory.

Important Price Changes

	June 30	July 31
Acid Cresylic, 95-97%	**$ .37**	**$ .42**
97-99%	**.40**	**.45**
Coaltar, bbls	**8.00**	**8.50**
Naphthalene, crude, 74-76%	**1.65**	**1.85**

Resin Statistics

Tariff Commission, in the course of its work, has collected statistics on the production and sales of many important chemicals. Certain of these statistics which have not hitherto been published and may be of interest to the plastics field are summarized in the following text and table. These data cover the noncoal-tar synthetic resins provided for in paragraph eleven.

Production of coal-tar resins other than those derived from phenol and cresol increased about 3% and sales about 13% by quantity, as compared with 24% decrease in production and 30% decrease in sales volume for phenol and cresol derivatives.

More than 150% increase in production and quantity of sales of noncoal-tar resins, statistics for which are publishable for the first time.

Higher Benzol Yields

Larger yields of benzol are now being obtained by Ruhr cokeries through the use of improved methods of recovery.

Higher yield, as measured by the output of coke, is explained by conversion of benzol plants to premit use of weaker washes involving only 60 degrees acid instead of 66 degrees as formerly and use of improved methods and equipment. Greater care in recovering benzol is also said to be contributing to the increased yield.

Benzol is very important item in the German supply of motor fuel because of the insufficient reserves of petroleum in that country. Large quantities of benzol are imported each year, despite the extensive cokery industry in the Ruhr district.

English (and Wales) coal-tar distillers treated 1,422,800 tons of tar in 1932. Output of pitch was 336,900 tons, higher prices causing an increase, while curtailment of highway work reduced the demand for dehydrated tar.

June Imports

June imports of synthetic dyes amounted to 382,452 lbs., valued at $389,174. Month's total was much larger than that of 117,792 lbs., valued at $109,208, imported in June, 1932.

Imports of synthetic aromatic chemicals continued to run below those in 1932, those in June being 34% less in quantity than those in June, last year. Imports of color lakes were almost 83% smaller. But, imports of other finished products and intermediates showed a gain of more than 233%.

Imports of Synthetic Dyes

	1933		*1932*	
	Pounds	*Value*	*Pounds*	*Value*
January..	314,878	$311,640	297,266	$259,558
February.	365,144	369,829	429,298	367,154
March...	267,890	257,626	482,545	410,865
April....	232,741	229,078	300,144	259,425
May.....	360,490	352,111	206,225	203,483
June.....	382,452	389,174	117,792	109,208
Totals.	1,923,595	1,909,458	1,833,270	1,609,693

Countries of Origin

	Percentages— June	
Germany	60.83	85.41
Switzerland	37.18	10.63
England	1.96	3.77
All other	.03	.19

Leading Dyes in June Imports

(*A total of 42, dyestuffs was imported.*)

	Pounds
Vat golden yellow GK double paste (single strength)	27,090
Trisulphon brown BP conc	13,030
Vat printing black B paste	7,500
Cibanone blue 3G paste	6,962
Chlorantin fast green B	6,615

Imports of Medicinals, Photographic Developers, Intermediates, and Other Coaltar Products

	1933		*1932*	
	Pounds	*Value*	*Pounds*	*Value*
January......	55,087	$40,480	38,622	$26,401
February.....	137,144	97,944	108,219	80,715
March........	177,781	52,090	87,479	63,690
April.........	179,063	60,366	92,067	72,609
May..........	90,056	67,574	134,789	31,675
June..........	172,945	130,904	51,902	44,868
Totals.....	812,076	449,358	513,078	319,958

Leading Products in June Imports

(A total of 113 products, including photographic developers as one group, was specified in the list for imports.)

	Pounds
Diazo salt GS	21,064
Alphanaphthol	11,025
Variamine blue salt B	10,760
Methylcyclohexanone	10,550
Dinitroetilbenedisulfuric acid	6,876
Orthocresol	6,720
Naphthoxythiophen	5,688
Bromamine acid	5,455

Coaltar Products in Bond

	Dyes and colors	*Intermediates*
November 30, 1932	1,066,457	858,793
December 31, 1932	1,173,247	984,868
January 31, 1933	1,147,434	953,842
February 28, 1933	1,172,054	925,697
March 31, 1933	1,199,679	794,497
April 30, 1933	1,149,303	768,286

Miner-Edgar benzol storage was threatened by fire July 29.

Treasury Dept. has published TD 46487, June 29, which gives recently adopted standards of strength of dyes and colors for a large number of items.

Synthetic resins: Production and sales, 1932 and 1931, and percentage of change in production
(Quantities in thousands of pounds and values in thousands of dollars)

	1932 Sales Quantity [1]	1932 Sales Value	1932 Sales Unit value	1932 Production Quantity [1]	1931 Sales Quantity	1931 Sales Value	1931 Sales Unit value	1931 Production Quantity [1]	Increase (+) or decrease (–) in production in 1932 from 1931 Percent
Coal-tar resins, total	**23,891**	**$5,001**	**$0.209**	**29 039**	**29,343**	**$7,862**	**$0.268**	**34,179**	**–15.0**
Derived from phenol and cresol	**15,042**	**3,946**	**.262**	**17,163**	**21,496**	**6,646**	**309**	**22 647**	**–24.2**
Derived from other sources [2]	**8 849**	**1 055**	**.119**	**11,876**	**7,848**	**1,216**	**.155**	**11,532**	**+ 3.0**
Noncoal-tar resins, total [3]	**1,787**	**796**	**.446**	**1,898**	[4]	[4]	[4]	[4]	

1. Based on net resin content.
2. Includes resins derived from phthalic anhydride, resorcinol, and coumarine and indene.
3. Includes resins from urea, vinyl acetate, and petroleum.
4. Not. publishable.

Paints, Lacquers and Varnish

Casein Leads Price Advances

The further spectacular rise in the casein market featured the paint materials market in July. This movement has now continued almost without interruption for three months and the last mark-up (1¾-2c) made in the last week of July was the sharpest of the several advances. Stocks of Argentine material are reported as being extremely scarce, and those following the market closely look for still further increases.

In general, the last 10 days of July indicated that the peak of the spring and early summer rush was over, and purchases in most items were reported sharply curtailed in the final week of the month. One exception was in lacquer raw materials.‡ While automobile production in July did not reach the June figure the number of units were estimated in excess of 200,000.† This condition has helped materially to move surplus solvent stocks, with the result that, while no published price changes were made, the entire structure had a much firmer appearance.

Wild speculation in flaxseed markets* (said to be easily the equivalent of anything ever before seen) pushed linseed up to extremely high levels which were lost after the four-day crash.

Consolidated in Economy

C. P. DeLore Co., St. Louis, has been consolidated with National Pigments & Chemical, of the same city, and will be operated in the future as the DeLore Division of the National Pigments & Chemical Co. C. P. DeLore will be managing director in full charge of production and sales.

‡Lacquer producers meet August 17, 11 A. M., Chemists' Club, (N. Y.), to form Lacquer Manufacturers Association.

†July total excludes Ford—178,506 units.

*Trading markets were closed tight for three days.

Important Price Changes

	June 30	July 31
Casein, dom, 20-30	$ .11¾	$ .15
Argentine, 20-30	.11¼	.14¾
80-100	.12	.15¾
Glues, bone	.08	.08½
hide, H. G.	.18	.20
Litharge	.06½	.07
Linseed, tanks	.101	.106
cooperage	.107	.112
Mercuric oxides, black	3.58	3.70
red	1.07	1.17
Orange mineral	.10	.10½
Putty, com.	2.00	2.25
in oil	3.40	4.00
Red lead	.07½	.08
Red oxide, Spanish	.01⅞	.03
Stearates:		
Aluminum	.15	.16
Calcium	.15	.16
Zinc	.16	.17
Magnesium	.17	.18

Effect of reduced consumption of refined ground barytes on costs of production, Mr. DeLore states, has made it desirable to consolidate manufacturing operations of the two companies in one plant.

Factory Replaced

The Bronze Powder, whose plant in Cleveland was destroyed by fire several months ago, has purchased a factory building along the main line of the N. Y. C. in Painesville, Ohio. Plant, comprising 20,000 square feet of floor space and seven acres of land, will be equipped for the manufacture of bronze powder and kindred products.

Glidden has purchased U. S. I. plant, adjoining Glidden Co.'s plant in Leclair ave., Chicago, Ill. Acquisition of the new property will double capacity of the present Glidden plant in Chicago.

Burgett Varnish, Norwood, Ohio, has been acquired by Heekin, Can, Cincinnati.

April Coating (Lacquers, Varnish, Paint) Sales*

Sales of paint, varnish and lacquer products in May totaled $27,574,056 in value, according to a preliminary report by U. S. Bureau of Census from data supplied by 588 establishments May sales were the best of any month since June, 1931, and compared with $20,343,454 in April and $24,981,441 in May last year. A record of sales in May, a comparison with the preceding months of 1933 and the entire year 1932, follows:—

	Total sales reported by 588 establishments	Classified sales reported by 344 establishments — Industrial sales — Total	Paint and varnish	Lacquer	Trade sales of paint varnish and lacquer	Unclassified sales reported by 244 establishments
1933—January	$11,946,271	$3,529,916	$2,386,977	$1,142,939	$4,163,960	$4,252,395
February	12,345,600	3,417,387	2,439,732	977,655	4,767,355	4,160,858
March*	14,431,360	3,384,766	2,477,369	907,397	5,794,823	5,251,771
April†	20,295,011	4,664,267	3,130,761	1,533,506	8,633,276	6,997,468
May†	27,574,056	6,053,233	4,360,312	1,692,921	11,752,360	9,768,463
1932—January	15,894,506					
February	16,270,822					
March	19,089,005	Comparable statistics not available				
April	22,612,193					
May	24,981,441					
June	19,637,358	4,685,399	3,617,719	1,067,680	8,734,330	6,217,629
July	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
August	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
September	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
October	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
November	13,260,328	3,599,319	2,639,362	959,957	5,196,766	4,464,243
December	10,127,780	3,222,770	2,186,706	1,036,064	3,506,715	3,398,295
Tot., year	$204,734,085	....	....	....	....	....
1931—May	33,402,978	Comparable statistics not available				
1931—Total	278,442,170	....	....	....	....	....

*Revised. †Preliminary.

Krebs Pigment & Color has given out contracts for the erection of a two-story addition to its filters at its establishment at Curtis Bay, Baltimore.

Rumors continue about the new lacquered tin beer containers. *N. Y. Times* reports that the glass industry is concerned about the possibility of beer marketed in non-returnable tin containers making serious inroads into the bottle industry.

Devoe & Raynolds increased wages and salaries of all employees by about 11% Aug. 1. Advance will restore salaries to basis prior to reduction June 1, 1932. "We are doing this at this time because we wish to cooperate with the Government in increasing the purchasing power of our employees and to express our appreciation for the loyalty and splendid work of the entire organization."—Elliott S. Phillips, president.

Here and There

John W. Marsh, Pomona, Fla., formerly with Sun Varnish for about five years and prior to that with Marietta Paint & Color, has returned to the varnish sales business, as representative of Schaefer Co., Louisville, and will travel Florida. Tennessee, Georgia and Alabama . . . Customer service department of Kentucky Color & Chemical has been placed in charge of Henry L. Beakes, who recently joined the technical staff . . . McCloskey Varnish, Philadelphia, has appointed W. E. Waples to its industrial division to represent the company in the middle west, and C. M. Peterson, Portland, Ore., to the sales force on the Pacific coast . . . Arthur R. Curphey, purchasing agent for the Patterson-Sargent Company, paint manufacturer, Cleveland, has resumed his duties after having been ill for some time . . . Arthur W. Steudel, a Sherwin-Williams vice-president and Luther H. Schroeder, treasurer, recently completed 25 years of service. A dinner and picnic were given in honor of the two executives, and George A. Martin, president, conferred certificates of long service and presented them with commemorative watches . . . John F. Keller, Archer-Daniels-Midland Co., accompanied by Mrs. Keller, left Aug. 3 on a cruise to Nassau and Bermuda . . . Jack F. Marx, City Hide & Tallow, sustained cuts and bruises July 21, when his car blew a front tire. Car left a road near Bowling Green, Ky., turning over several times . . . Nelson M. Graves, vice-president of McDougall-Butler, concluded, June 20, a year of service as president of the Buffalo Chamber of Commerce . . . R. Davison, manager of the market development division of N. J. Zinc, has been elected second vice-president of the National Industrial Advertisers Association . . . Adrian D. Joyce, Glidden President, accompanied by Mrs. Joyce, sailed July 11 on the "Bremen."

Naval Stores

Net Gains in July

Naval stores prices in primary markets as well as in the various local markets registered net gains for the past month, although they closed considerably under the high point reached in the third week and previous to the sudden drastic declines registered in the stock and commodity markets. With the price structure went the demand for a time, but the last week saw a much more enthusiastic buying call for material in all important centers. Still, trading activity was not as brisk as that of June and the first two weeks of the past month. However, the drastic declines of 5½c on turpentine and nearly 90c (on the rosin barrel) were concessions that appealed to buyers, particularly those buying for foreign consumption. Belief in most quarters as the month closed was that the naval stores markets had reached bottom late in the month and that the trend for the immediate future appeared to be towards higher levels again. A large part of the speculative influence has been cleaned out of the picture.

In the last few days of the month inquiry disclosed a very satisfactory tankcar movement of turpentine to northern points. Foreign trade in July again appeared to have represented a large part of the rosin sales, with Japan, the Scandinavian countries and United Kingdom taking the major part of the shipments.

June foreign movement figures have been released and show a decided upward trend over the preceding months. Spirits turpentine, gum 35,995 barrels, wood 1,414. Total 37,408 barrels. Rosin, gum 94,532, wood 22,272. Total 116,804 barrels.

June Exports

Year	Bbls. S. T.	Bbls. Rosin
1933	37,408	116,804
1932	27,128	86,805
1931	11,600	75,574
1930	33,965	131,982
1929	39,135	153,090

April-May-June Exports

Year	Bbls. S. T.	Bbls. Rosin
1933	79,508	309,827
1932	66,001	273,885
1931	35,919	237,176
1930	80,114	354,943
1929	87,492	353,951

Receipts, at primary ports according to reports, are running with a less percentage of increase. While June is said to have showed over 30% increase at the Ports July is not expected to show over 20% increase. Savannah and Jacksonville dealers are looking for an active market. However, August is usually the dullest month of the year and 1933 may prove to be no exception after all.

N. R. A.—Naval Stores

Naval stores committee composed of Porter Mackall, chairman; J. C. Nash, both of Savannah; and Herbert Moller, of Jacksonville, is at work on a code for the Southern naval stores trade, according to the *Savannah Weekly Naval Stores Review*, it being the purpose to have one prepared and thoroughly discussed and brought into final shape for adoption and presentation to the federal government whenever, and if ever, the naval stores distributors of this section are called on for a code of this nature. It is regarded as quite likely, in view of the trend toward having all branches of trade and industry regulated, to a greater or less degree, by government approved codes, that such a summons will eventually come.

Steam-Distilled Group

General Naval Stores, Naval Stores Division of the Hercules Powder, and Newport Industries, Inc., have signed President's Blanket Code. These three companies manufacture and sell about 85% of all naval stores manufactured by the steam-solvent process in the U. S. They operate plants in Brunswick, Georgia; Pensacola, Florida; Bay Minette, Alabama; Hattiesburg, Mississippi; and DeQuincy, Louisiana; and employ in the neighborhood of 1,000 men, all of whom will be affected by the new Code. Several hundred additional employees will be added to their payrolls as a result of the shorter working week provided by the Blanket Code.*

*A specific code is being drafted.

Statistics of the Jacksonville Market

ROSIN

Grade	July 1	July 8	July 15	July 22	July 29	Same time last year	Net Gain or Loss this Month	Net Gain or Loss from Last Year
B	3.30	4.00	4.15	4.00	4.00	2.00	+.70	+2.00
D	3.50 —3.60	4.00	4.15	4.00	4.00	2.00	+.50	+2.00
E	3.67½—3.77½	4.35	4.20	4.00	4.00	2.10	+.32½	+1.90
F	3.70 —3.77½	4.35	4.20	4.00	4.00	2.20	+.30	+1.80
G	3.75 —3.77½	4.35	4.20	4.00	4.00	2.20	+.25	+1.80
H	3.75 —3.77½	4.35	4.20	4.00	4.00	2.20	+.25	+1.80
I	3.75 —3.77½	4.35	4.20	4.02½	4.00	2.25	+.25	+1.75
K	3.77½—3.80	4.35	4.30	4.05	4.00	2.30	+.22½	+1.70
M	3.77½—3.80	4.35	4.30	4.05	4.00	2.95	+.22½	+1.05
N	3.85 —3.90	4.40	4.35	4.10	4.00	3.40	+.15	+ .60
WG	3.90 —4.00	4.40	4.35	4.15	4.10	4.00	+.10	+ .10
WW	4.10 —4.00	4.60	4.45	4.25	4.25	4.00	+.15	+ .25
X	4.10 —4.00	4.60	4.50	4.25	4.25	4.75	+.15	— .50
Market	Firm	Firm	Firm	Firm	Firm	Firm		
SPIRITS TURPENTINE								
Price	42¼	50	48¼	45½—46	47—47¼	35¾—36	+4¾	+.11¼
Market	Firm	Firm	Firm	Firm	Firm	Firm		

Receipts and Shipments

Week Ending	Spirits Receipts	Spirits Shipments	Rosin Receipts	Rosin Shipments	Same as Last Year: Spirits Receipts	Spirits Shipments	Rosin Receipts	Rosin Shipments
July 1	3,797	11,955	12,636	22,806	2,522	523	9,292	9,521
July 8	2,680	345	10,391	5,738	2,308	2,812	8,348	10,640
July 15	3,079	433	11,467	5,060	2,764	480	9,590	8,066
July 22	2,907	5,986	11,990	19,884	3,042	2,715	10,872	12,597
July 29	3,438	1,178	14,334	14,925	3,318	3,064	11,066	6,995
This month	12,719	7,942	49,968	46,484	12,228	9,189	42,653	128,919
Since April 1	48,914	49,509	177,789	190,691	41,491	39,897	149,846	128,919
Foreign	......	40,248	......	125,867	......	29,148	......	86,428
Domestic	......	9,261	......	64,824	......	10,749	......	42,491

Stocks	Spirits	Rosin	Same Time Last Year: Spirits	Rosin
April 1	36,712	116,429	41,691	155,883
July 1	31,340	100,043	39,831	178,910
July 29	36,117	103,527	42,870	175,335

Statistics of the Savannah Market

ROSIN

Grade	July 1	July 8	July 15	July 22	July 29	Net Gain or Loss this Month
B	3.50	4.25	4.15	4.00	4.00	+.50
D	3.60	4.25	4.15	4.00	4.00	+.40
E	3.77½	4.30	4.15—4.25	4.00	4.00	+.32
F	3.77½	4.30	4.15—4.25	4.00	4.00	+.32
G	3.77½	4.30	4.15—4.25	4.00	4.00	+.32
H	3.80	4.30	4.15—4.25	4.00	4.00	+.20
I	3.80	4.30	4.20—4.25	4.02½	4.00	+.20
K	3.80	4.30	4.20—4.25	4.05	4.00	+.20
M	3.90	4.35	4.25	4.05	4.00	+.10
N	3.90	4.40	4.25—4.30	4.10	4.00	+.10
W. G.	3.90	4.45	4.30—4.35	4.15	4.10	+.20
W. W.	4.00	4.60	4.40—4.45	4.25	4.25	+.25
X	4.00	4.60	4.45	4.25	4.25	+.25
Market	Firm	Firm	Firm	Firm	Firm	
SPIRITS TURPENTINE						
Price	.42¼	.50	.48½—.48¾	.46½	.46¼	+.04
Market	Firm	Firm	Firm	Firm	Firm	

Receipts and Shipments

Week Ending	Spirits Receipts	Spirits Sales	Rosin Receipts	Rosin Sales	Same as Last Year: Spirits Receipts	Spirits Shipments	Rosin Receipts	Rosin Shipments
July 1	651	103	2,266	1,689	434	....	1,460	....
July 8	635	88	2,182	990	342	....	1,539	....
July 15	628	100	2,231	632	490	....	1,388	....
July 22	425	92	2,438	1,113	586	....	1,772	....
July 29	576	50	2,024	992	352	....	1,888	....
This month	2,915	433	11,141	5,416	2,204	....	8,047	....
Since April 1	55,602	....	192,328	....	44,129	....	162,186	....

Stocks	Spirits	Rosin	Same as Last Year's Spirits	Rosin
July 1	16,589	109,783	9,158	173,239
July 27	15,254	121,069	15,903	186,975

H. M. Wilson, chairman, Jacksonville; E. M. Sessions, Jacksonville and Harley Langdale, of Valdosta, Ga., a committee representing a large group of gum turpentine-rosin producers of Florida, Georgia and Alabama, journeyed to Washington late in July to appear before Assistant Administrator Wayne C. Taylor of the Agricultural Adjustment Act at the Dept. of Agriculture to discuss feasibility of operations by the gum turpentine-rosin industry under the provisions of the Agricultural Adjustment Act.

This committee was appointed at a meeting of the naval stores dealers and brokers, held at the Savannah Board of Trade on July 18. Present: Messrs. Lewis, Lining, Moller, Adamson and Godwin, representing Jacksonville trade, and Messrs. Nash, Mustin, Thorpe, McGillicuddy, Theus and Mayers of the naval stores dealers of Savannah. Messrs. Carl Speh, of the Pine Institute of America, and J. E. Lockwood, of Savannah, also attended by invitation.

1932 Consumption

Bureau of Chemistry and Soils has published figures compiled on consumption and stocks of turpentine and rosin for 1932. These figures are not complete, however, due to the failure of a number of consumers, principally among the paint and varnish manufacturers, to reply to the repeated requests for their consumption and stock figures.

Years 1930, 1931, and 1932

	Turpentine (Gallons) 1932	1931	1930
Automobiles and wagons	33,245	87,072	80,953
Chemicals and pharmaceuticals	32,495	41,259	70,185
Foundaries and foundary sup.	5,750	6,305	27,144
Linoleum	2,539	2,703	2,754
Matches	......	......	......
Miscellaneous	39,960	40,917	65,556
Oils and greases	75,192	54,224	21,776
Paper and paper size	1,666	2,349	1,771
Paint and varnish	2,280,214	3,444,882	4,089,743
Printing ink	22,635	14,562	11,209
Sealing wax, pitch, insulation and plas.	36,262	42,353	70,236
Shipyards, car shops, etc.	34,188	46,258	65,520
Shoe polish	549,282	555,046	527,838
Soap	8,733	5,700	10,539
Total	3,122,161	4,343,630	5,045,224

	Rosin (Round 500-lb. bbls.) 1932	1931	1930
Automobiles and wagons	773	591	3,523
Chemicals and pharmaceuticals	3,028	3,938	5,246
Foundaries and foundary sup.	3,663	7,193	17,399
Linoleum	16,003	21,746	29,458
Matches	2,749	2,453	2,953
Miscellaneous	770	2,362	3,752
Oils and greases	21,899	29,565	49,828
Paper and paper size	261,000	299,934	341,327
Paint and varnish	121,240	155,592	192,878
Printing ink	10,225	15,164	13,104
Sealing wax, pitch, insulation and plas.	11,559	13,902	26,291
Shipyards, car shops etc.	108	74	3,086
Shoe polish	290	587	610
Soap	261,350	239,869	218,967
Total	714,657	792,970	908,422

Note—Non-reporting industrial concerns probably consumed about 340,000 gallons of turpentine and 10,000 barrels of rosin in addition to the above figures for 1932.

Consumption data are for calendar years. Other data herein given are for the fiscal or operating year of the naval stores industry, from April 1 to the following March 31.

D. A. Sapp In New Venture

Gum Swamp Turpentine (D. A. Sapp, (also vice-president Operator's Factory Co., Savannah) Robert A. Sapp and Chas. E. Donnelly) formed in Savannah.

Uruguay has started a small naval stores industry.

Y. F. Carter, Ray City, Ga., has rebuilt with a modern turpentine plant. Other plants rebuilt include, Coolidge Naval Stores, Coolidge, Ga.; Brown Bros., Hortense, Ga.; Z. W. Kirkland, Crawley, Ga., is a new naval stores producer.

June production of naval stores by steam distillation and solvent treatment of wood and stocks of these products on hand June 30, according to data collected by the producers' committee, through Arthur Langmeier, Hercules Powder, secretary:

Production	Rosin 500-lb. barrels	Turpentine bbls. 50 gallons	Pine oil Gallons
Month of June	35,163	5,514	215,130
Total from April 1, 1933	67,038	10,686	427,812
Stocks at Plants			
Totals, June 30, 1933	63,058	7,242	......
Mar. 31, 1933	98,615	12,387	......
Change	—35,557	—5,145	......

Note—Rosin production and stocks include all grades of wool rosin.

Gums, Waxes, Shellac

Exchange Again

Gums and waxes were again generally higher in July. Demand was curtailed somewhat by the adverse influence exerted by the sudden reversal in the stock and commodity markets. In the last few days of the month buying was on a smaller scale and represented largely replacement purchasing, rather than further future commitments.

Important Price Changes

	June 30	July 31
Arabic, amber sorts	$.07	$.07½
Benzoin, Sumatra	.19	.20
Camphor, slabs	.44	.52
powder	.45	.58
Copal, Congo, amber dark	.07½	.08
Amber sorts, chips	.04	.06
Ivory opaques	.21½	.24
Picture	.40	.45
East India	.05½	.05⅝
Singapore	.14	.16
Manila, Loba C	.09½	.10½
Pontianak, split chips	.14½	.16½
Dammar, Batavia A-E	.12½	.15
A-D, mixed	.14½	.18
E, seeds	.07	.09
Singapore	.14¾	.17
Ester, dark	.04½	.04¾
Gambage, pipe	.50	.53
Karaya XXX	.20	.23
Mastic	.29½	.30
Sandarac	.24½	.26½
Tragacanth, No. 1	.75	.90
No. 2	.67	.80
No. 3	.45	.70

Dealers are inclined to believe that actual consumers are now fairly well stocked ahead, contrasting with the position held by most of the buyers up to the abandonment of the gold standard several weeks ago. The opinion is freely expressed that in that period considerable stocking was done, and that buyers now are in the position to wait temporarily to see the future trend of business and exchange. In some items, notably tragacanth, Arabic sorts, etc., however, prices were particularly firm as the month closed, indicating possibly higher figures.

Shellac registered two impressive advances in July, due to the higher cost of replacement in the primary market and the change in the foreign exchange rates. Like most of the more speculative items buying dropped off temporarily in the last few days of July. Shellac varnish producers are said to be confidently waiting a resumption of purchasing on a larger scale about the middle of August in preparation for the fall retail pick-up.

Arrival of several shipments eased the temporary tightness of the June Carnauba wax market locally, and prices, accordingly, were slightly easier. All of the other leading items in this group gained price ground in the past month but closed easy as demand tapered off somewhat from the brisk condition prevailing up to and including the third week in July. Portuguese shippers of beeswax have returned to their former practice of quoting African material in dollars. For a time they went to sterling quotations because of the resulting currency exchange confusion when the U. S. suddenly went off the gold standard.

Important Price Changes

ADVANCES	June 30	July 31
Bayberry	$.14	$.16
Beeswax, yellow	.16½	.19
Japan	.06½	.07½
Montan	.06¼	.08
Spermaceti, blocks	.19	.21
cakes	.20	.22
DECLINES		
Carnauba, No. 1	.30	.29
No. 2 yellow	.29	.28
No. 2 N. C.	.18	.17½

From Brazil comes reports that stocks of the old crop of Carnauba are now small and with the new not due to arrive until September a rather firm situtation in the primary market is more than likely in the next few weeks.

Joint Shellac Research

Participation in shellac research work conducted by U. S. Shellac Importers' Association has been proposed to the association by the Indian Lac Research Committee. J. Lindsay, Trade Commissioner for India, quartered in London, has been in touch with officers of the association, and it is expected that he will come to this country to confer regarding the scheme.

Shellac Prices, Weekly High - Low for London, Calcutta, N. Y. City

Week of	London Aug.	London Oct.	London Dec.	Calcutta July T. N. C. & N. Y.	New York City Bone Dry 10 bbls.	New York City Bone Dry 5 to 9 bbls.	New York City Bone Dry 1-4 bbls.	New York City T. N.	New York City Superfine
June 30	54s 6d—67s 6d	55s 6d	....	11¼—.12⅞*	.20	.21	.22	.12½—.13¼	.13½—.14¼
July 7	64s 6d—67s 6d	66s—68s 6d	....	.12½—.13⅜	.22	.23	.24	.12½—.14¼	.13½—.14½
July 14	60s—66s 6d	61s 6d—67s 6d	....	.12½—.13⅜	.22	.23	.24	.15 —.15¾	.16 —.16¾
July 21	60s 6d—61s	61s—63s	62s—64s	.12 —.12½	.22	.23	.24	.15 —.15¾	.16 —.16¾
				August					
July 29		59s 6d—60s	60s 6d—63s	.11½—.12	.24	.25	.26	.17 —.17¾	.18 —.18¾

*Sterling exchange at $4.88. Prices subject, of course, to rate of exchange prevailing in London.

London Naval Stores Market

Week Ending	Rosin High & Low W. W. Grade	Turpentine High & Low	American Turpentine Stocks 1933	American Turpentine Stocks 1932
June 30	20s—18s 6d	55s 3d—52s 6d	2,851	14,077
July 7	18s 17s 6d	52s 9d 52s 3d	3,234	11,850
July 14	17s 6d	52s 3d 50s 9d	2,614	10,504
July 20	17s 6d	50s 9d 49s 6d	10,952	13,741
July 28	16s 6d—16s	49s 6d 48s 3d	9,852	13,484

Metals and Alloys

Antimony Advances

After lagging somewhat behind the other metals in registering impressive price advances, antimony in July increased 1¼c to a new high of 7½c. All of the metals suffered in the general collapse in the commodity markets. From new highs silver and tin declined to a point where the net change for the month was a loss of ½c for tin and ¼c for silver. Lead and zinc, although closing at prices below the month's high, managed to register net gains for the 30 day period. After the break (July 21) trading in both zinc and lead became very quiet. Ore prices were strong in the Tri-State section, however, and this was looked upon as a strong indication that prices will remain firm. Despite quiet conditions in the copper market in the last two weeks of the month, prices were well maintained.

Important Price Changes

	June 30	July 31
Antimony	$ .06¼	$ .07½
Copper	.08½	.08¾
Lead	4.15	4.35
***Silver**	.36⅜	.36⅛
***Tin**	.46½	.46
Zinc	4.60	5.00

***Declines.**

Zinc Production

World zinc production in June totaled 85,575 short tons, against 85,693 tons in May, and 70,306 tons in Juhe, 1932, according to American Bureau of Metal Statistics. U. S. production in June was 24,027 short tons, against 21,730 tons in May.

World zinc output in June averaged 2,853 short tons a day compared with 2,764 in May, 2,725 in April and 2,344 a day in June, 1932. World production of zinc in the first half was 491,823 tons compared with 456,738 in first six months of 1932.

Following tables give in short tons the output of zinc for the various countries. This is according to output by metallurgical works and not according to country of origin of the ore.

	May	June	Jan.-June
U. S.	21,730	24,027	129,205
Mexico	2,744	2,494	15,679
Canada	6,945	6,705	40,573
Belgium†	12,125	11,954	66,822
France	5,567	5,213	31,972
Germany	4,526	4,484	25,949
Italy	2,211	2,090	11,917
Netherlands	1,605	1,560	9,137
Poland†	7,546	7,254	42,708
Rhodesia	1,854	1,792	10,009
Spain	754	734	4,717
Anglo-Australian	8,886	8,168	49,935
Elsewhere‡	9,200	9,100	53,200
World's total	85,693	85,575	491,823
U. S.	21,730	24,027	129,205
Elsewhere	63,963	61,548	362,618
Stock at end:			
U. S.	136,634	123,924	......
Cartel report	151,683	145,333	......

†Included salable zinc dust. ‡Partly estimated; includes Norway, Jugoslavia, Czechoslovakia, Russia, Indo-China and Japan.

Lead stocks in the U. S. at the end of June were 193,005 short tons, against 197,109 tons at the end of May and 181,044 tons at the end of June a year ago. Production was greater in June, with 30,727 tons, against 28,488 tons in May and 28,709 tons in June, 1932. June shipments exceeded production and totaled 34,825 tons, against 28,197 tons in May and 22,295 tons in June last year.

New I. G. Alloy

I. G. has a new light alloy especially suited for the building of hydroplanes—it successfully resists corrosion due to sea water. In Germany this new alloy is called "Hydronalium" and consists largely of aluminum to which 10% of magnesium and small quantities of manganese are added. Specific gravity of "Hydronalium" is 2.60, while that of aluminum is 2.70. Preliminary tests, carried out with this alloy, were entirely successful and it is now ready for marketing.

Zinc Cartel Revived

Thirty former International Zinc Cartel members at Ostend meeting July 12 virtually agreed to resume cartel relations on a basis of 50% production against 45% rate. New agreement is expected to contain clause permitting formal withdrawal after two months notice.

Group of NIRA codes are being drafted for miners of rare minerals and metals by the American Mining Congress. Separate code has been made for quicksilver producers and others for other minerals, although an attempt will be made to harmonize codes as much as possible.

Soviet Rare Metals

Soviet is exploiting rare elements, and titanium ores are being given special attention. Enormous deposits of ferrotitanium ores in the Urals have not yet been utilized. Trust, "Lakokraska," is arranging for the construction of a new plant for production of titanium white.

Bureau of Mines has released R. I. 3218—Report of Investigations—"Volatilization of Impurities from Zinc Concentrates." Copies are available by writing Bureau's Washington office.

Golconda Lead Mines, Wallace, Idaho, is resuming operations development.

Empire Zinc, Gilman, Colo., has increased wages of 200 employees 12½%.

Quantities of potash, in thousands of tons of K_2O, sold by principal producing countries, were:—

	1931	1932
Germany	970	847
France	355	306
Poland	35	33
Spain	30	34
United States	60	45
Russia	18	40

Weekly Metal Statistics: Prices Basic Metals

Week Ending	Lead High & Low E. St. Louis	Lead High & Low N. Y.	Zinc High & Low E. St. Louis	Zinc High & Low N. Y.	Copper High & Low	Tin High & Low Straits	Tin High & Low Standard	Silver Bulletin High & Low N. Y.	Silver Bulletin High & Low London, pence
June 30	.0404—.0405	.0420	.0435—.0450	.0470—.0485	.08	......	......	.34¾—.26⅛	.18⅞—.19⅛
July 7	.0405—.0425	.0420—.0440	.0450—.0470	.0485—.0505	.08¾	......	......	.36 —.36¾	.18⅝—.18½
July 14	.0425—.0435	.0440—.0450	.0480—.0485	.0515—.0520	.08⅞—.09	......	......	.37 —.40⅛	.17⅞—.19⅝
July 21	.0435	.0450	.04925—.05	.0535	.09	.4660—.4810	.4500—.4680	.37½—.40⅜	.18⅛—.18¾
July 28	.0435	.0450	.05 —.049	.0535—.0525	.09	.4450—.4500	.4550—.4455	.37½—.35½	.17⅝—.18⅝
Net gain or loss	+.0031	+.0030	+.0065	+.0065	+.01			+.2¾	—½

Oils and Fats

Important Price Changes

	June 30	July 31
Castor, No. 3	$ .08¾	$ .09¾
Chinawood	.07¾	.09
Coconut, tanks, Pacific C.	.03	.03⅛
Codliver	26.00	28.00
Copra	.0162½	.0170
Corn, crude mills	.06¾	.07⅝
Menhaden, refined	.0635	.065
Olive oil, denatured	.66	.75
Olive oil foots	.05½	.06¼
Palm, Niger	.03¾	.04⅜
Peanut, crude, tanks	.05	.05¾
Perilla, tanks Pacific Coast	.08½	.09¾
drums	.09½	.10¼
Rapeseed, denat.	.48	.62
Soybean, dom., tanks	.07½	.08½
Sperm, 38°	.101	.103

Prices Rise Generally

Most of the oils and fats in the vegetable and animal groups moved into new high ground in the past month. Trading was quite brisk up to the point where the stock and commodity markets registered sharp losses. From that point on buying slowed down considerably and purchasing was done on a more conservative basis. In the last week sales were again for the first time in many weeks largely of a replacement nature, and therefore of much smaller tonnages. At the same time most of the oils turned easier, although very few published prices were changed, indicating that the immediate market ahead might find prices lower.* Rapeseed proved to be one exception to the predominating tone, and because of scarcity of stocks, denatured grade (spot) was advanced 6c per gal. in the first week of August. The fish oil market contrasted somewhat with that which existed in the vegetable oils. A greater degree of firmness characterized the situation both in the local market and in the Baltimore and Pacific Coast markets.

Linseed In 2nd Quarter

Linseed oil production figures for the second quarter of 1933 have just been prepared by the Bureau of the Census in Washington. Total production of Linseed from April 1 to June 30 in this country was 79,034,582 lbs. as compared with 79,563,929 lbs. for first quarter for this year and 67,296,094 lbs. for the second quarter of 1932. Stocks of flaxseed at the mills amounted to 23,901 tons as compared with 40,861 tons for the same date in 1932, while stocks of Linseed oil reported by the crushers were 59,191,846 lbs. on June 30, 1933 as compared with 84,170,044 for the same date in 1932. According to Bureau of Agricultural Economics, commercial stocks of flaxseed in the U. S. on July 15 were 963,000 bu. compared with 949,000 bu. for corresponding date last year.

*Prices generally were weaker in first week of August with trading of a very routine nature.

R. M. Julian has become associated with the Southern Oil at Columbus, Ohio, as general superintendent. He is one of the most widely known men in the industry in the Southwest, having formerly been associated with Cameron Oil, Cameron, Tex., for many years.

Edgar H. Laing, N. Y. City vegetable oil and greases, broker, who has been recuperating at Wolfeboro, N. H., from a heart attack is reported making favorable progress toward complete recovery.

Japanese scientist claims to have discovered process of manufacturing lubricating oil from whale oil at an announced cost of about $1.50 a gal. at current exchange.

Entire testimony of the Federal Trade Commission's hearings on cottonseed has been printed in 12 volumes as Senate Document 209. Report was submitted May 19. Mimeographed copies of the summary of the report are available from the Commission. Entire report will be available later.

Third regional meeting of the Tri-States Cottonseed Oil Mill Superintendents' Association was held at Greenville, Mass., July 29. Another regional meeting will be held August 19 at Pine Bluff, Ark.

Linseed Oil Prices, Minneapolis, London, San Francisco and Chicago

Week Ending	Minneapolis Carlots cooperage	Minneapolis Tanks	London per cwt. Week High & Low	San Francisco Carlots	San Francisco Tanks	Chicago Carlots	Chicago Tanks
June 30	10.1	9.7	20s 1½d—20s 9d	10	9.8	9.9	9.3
July 7	10.5	10.1	20s 4½d—20s 10½d	10.8	10.2	10.5	9.9
July 14	10.5	10.1	20s 6d —20s 10½d	11	10.4	10.9	10.3
July 21	11.2	10.8	20s 6d —21s 3d	11.7	11.1	11.4	10.8
July 29	11	10.6	20s 6d —20s 9d	11.5	10.9	11.2	10.6
Net Gain or Loss for Month	+.9	+.9	+4½d	+1.5	+1.1	+1.3	+1.3

Domestic Flaxseed Receipts by Weeks

Week Ending	July 7 1933	July 7 1932	July 15 1933	July 15 1932	July 22 1933	July 22 1932	July 29 1933	July 29 1932
Minneapolis Cars	37	18	23	15	14	15	15	9
Duluth "	48	31	22	22	20	17	22	11
Winnipeg "	64	43	50	80	95	75	90	57
Total to date this crop	9,091	8,941	9,186	9,058	9,315	9,165	9,442	9,242

Minneapolis Linseed Oil and Meal Shipments

	Oil in lbs. 1933	Oil in lbs. 1932	Meal in lbs. 1933	Meal in lbs. 1932
Week Ending June 30	3,098,334	782,490	1,726,705	987,020
" " July 7	1,400,807	868,667	1,883,097	1,268,041
" " July 14	1,946,745	610,898	1,939,475	1,346,020
" " July 22	1,402,549	687,164	2,456,860	1,782,671
" " July 29	663,501	879,166	1,782,233	2,653,013
Previous total, June 30	59,187,644	52,291,605	93,985,660	97,971,270
Total to date	64,440,252	55,337,500	102,208,328	105,021,015

Cottonseed Statistics

Cottonseed products manufactured, shipped out and held in period Aug. 1 to June 30, 1933 and 1932, as reported by Bureau of the Census.

	On hand August 1	Produced Aug. 1 to June 30	Shipped out Aug. 1 to June 30	On hand June 30
Crude oil, pounds—				
1932-1933	*29,523,581	1,393,617,808	1,372,663,894	*63,759,258
1931-1932	8,086,071	1,664,841,990	1,635,893,226	51,172,306
Refined oil, pounds—				
1932-1933	†628,420,148	‡1,215,330,264	....	†737,848,974
1931-1932	277,836,530	1,467,719,870	....	672,821,827
Cake and meal, tons—				
1932-1933	114,656	2,018,846	1,935,600	197,902
1931-1932	146,888	2,359,994	2,371,366	135,516
Hulls, tons—				
1932-1933	162,773	1,269,968	1,352,183	80,558
1931-1932	47,723	1,481,982	1,349,928	179,777
Linter, running bales—				
1932-1933	235,521	711,597	834,954	112,164
1931-1932	175,904	859,865	777,923	257,846
Hull fiber, 500-lb. bales—				
1932-1933	4,138	18,303	19,167	3,274
1931-1932	3,564	33,091	32,421	4,234
Grabbots, motes, etc., 500-lb. bales—				
1932-1933	15,250	27,122	36,131	6,241
1931-1932	12,475	30,887	26,658	16,704

*Includes 4, 182,006 and 10,263,309 pounds held by refining and manufacturing establishments, and 7,235,770 and 14,436,230 pounds in transit to refiners and consumers August 1, 1932, and June 30, 1933, respectively.

†Includes 4,652,177 and 3,013,403 pounds held by refiners, brokers, agents, and warehousemen at places other than refineries and manufacturing establishments, and 5,598,691 and 2,771,715 pounds in transit to manufacturers of lard substitute, oleomargarine, soap, etc., August 1, 1932, and June 30, 1933, respectively.

‡Produced from 1,323,775,333 pounds of crude oil.

Exports for Ten Months up to May 31

		1933	1932
Oil, crude	lbs.	32,676,801	30,794,609
Oil, refined	lbs.	8,138,762	6,414,196
Cake and meal	tons of 2,000 lbs.	149,272	205,749
Linters	running bales	145,211	100,667

Fertilizers

Marking Time

Price changes were relatively few in the fertilizer field and these were mostly in the organic ammoniates. Blood, nitrogenous material and tankage were generally higher with stocks small.

Speculation on price changes centered largely around nitrate of soda (in some quarters higher prices are looked for in December), and on potash salts. With the reported collapse of the Paris negotiations between the Chilean and synthetic groups it would appear that the price outlook was not overly bright. On the other hand, the decline in the dollar value makes it difficult to see any lowering of the price level.

One of the major reasons assigned for not releasing the potash schedule was the London Economic Conference. With that meeting adjourned with little or no practical results achieved (certainly not that of currency stabilization) this reason for withholding the schedule was at least removed. In certain quarters it was reported that the final schedule would be withheld still further pending filing of a code by the domestic producers and the establishment of new prices based on the labor and wage requirements of that document.* For the present a small amount of business was passing at provisional prices. From Baltimore comes reports of a fair Menhadan catch, but the immediate demand is quiet. The item is in a strong position however.

*During first week in August imported potash-magnesia sulfate was reduced to $25 (a reduction of $2.80 from last year's base price) for material in bags analyzing 48-53% K_2O, minimum 48%. Agency was taking orders at $25, less provisional 10½%, which is allowed on all potashes, subject to adjustment when permanent prices are issued.

Important Price Changes

	June 30	July 31
Blood, high-grade ground Chicago	$1.90	$2.50
Blood, dried, N. Y.	2.25	2.60
Castor Pomace	16.50	18.00
Fish scrap, unground	2.60&10	2.75&10
Hoof meal, Chicago	1.25	1.40
Nitrogenous, imported	2.50	2.75
domestic	Nom.	2.50
western	2.00	2.15
Tankage, ground, N. Y.	2.50&10	2.75&10
Chicago	2.25&10	2.75&10
imported	2.75&10	3.25&10

One interesting price advance was that made in urea-ammonia liquor, amounting to 10c per unit.

How to Become An N. F. A. Member

A fertilizer manufacturer may now become a N. F. A. member by forwarding application to Secretary, Charles J. Brand. Prior to the adoption of this amendment, approval of Board of Directors was necessary before application could be acepted. While the Board has never refused application of any bona fide manufacturer, this change in the by-laws was made to conform with the NIRA policy which requires that no company in an industry can be excluded from its trade organization, if that organization is to be recognized by the Administration. N. F. A. is making a special drive for members at the moment.

Fertilizer Patents

Two patents on fertilizers, one a basic, the other a specific product, have been obtained by J. H. Dean, Knoxville Fertilizer Co., official. He has assigned them to the company. One patent is for basic and pulverized fertilizers, the other for "Amnite," a particular type of ammonia fertilizer. According to authorities Knoxville Fertilizer Co. is the only plant which now manufactures a completely pulverized fertilizer. Company holds patents on process in addition to new patent on this product.

Chilean Nitrate Plans

Plan for reorganization of the Chilean nitrate industry has been introduced as a bill in the Chilean Congress and referred to a committee for further study.

By the terms of the bill the sales corporation will be formed to acquire existing stocks at three pounds sterling a metric ton f.a.s. Owners of nitrate would receive from the sales corporation 75% of the sales price in excess of three pounds a ton while 25% of the overage will go to the State.

Sales corporation is obliged to fill new orders from current production to the extent of 80% of the total quantity while annual sales are under 1,000,000 tons—when sales exceed 1,000,000 tons, 32% of the excess over the million may be supplied from stocks.

A conference between nitrate producers and manufacturers of synthetic nitrates in Paris has failed. Parley had been seeking a world agreement to stabilize prices and control output. "It has not been possible to reconcile the divergent views of the European and Chilean industries," said a communique issued as the conference ended.

The Chilean delegates were in complete accord with their European competitors on the question of price fixing, it is said, but found the allotment to Chile in the European market unacceptably small, and so withdrew.†

Cyanamid's agricultural research director, Dr. Firman E. Bear, told those attending the World's Grain Exhibition and Conference at Regina, Saskatchewan, July 25, that with the pre-war selling prices for nitrogen cut in half, possibilities in the profitable use of this element for fertilizer purposes have increased.

Technical Bulletin 364, U. S. Dept. of Agriculture, "The Composition and Distribution of Phosphate Rock with Special Reference to the United States." The authors are K. D. Jacob, chemist, and W. L. Hill, H. L. Marshall, and D. S. Reynolds, assistant chemists in the Bureau of Chemistry and Soils. Numerous tables are presented showing not only the ordinary composition of various phosphate rocks but also the content of a number of

†Paris attempts were outgrowth of preliminary conferences secretly held in U. S. in April this year (CHEMICAL MARKETS, May, p. 433). No intimation was ever given as to the results of the informal meetings held at that time, but subsequently nitrogen prices have strengthened in this country. This is due partially at least to the general price rises incident to the inflationary efforts made in the past four months.

June Fertilizer Tag Sales

	Equivalent tons*							
	June				January-June			
	P.C. of 1932	1933	1932	1931	P.C. of 1932	1933	1932	1931
South—								
Virginia	77	3,281	4,255	7,358	108	222,233	205,876	306,669
North Carolina	40	5,621	13,907	24,630	129	824,869	639,555	967,302
South Carolina†	188	8,070	4,292	23,470	125	527,882	423,594	576,925
Georgia§	950	4,871	513	2,221	109	386,304	355,114	683,902
Florida†	86	15,259	17,761	11,288	90	173,212	192,427	234,212
Alabama	800	2,800	350	2,550	134	269,500	201,650	416,500
Mississippi	529	2,775	525	1,341	101	84,546	83,525	194,836
Tennessee†	...	......	45	407	121	63,251	52,321	105,706
Arkansas‡	100	100	100	100	122	21,035	17,298	60,946
Louisiana†	1,367	287	21	250	112	35,894	32,125	73,933
Texas	40	20	50	275	91	27,110	29,648	57,842
Oklahoma	...	10	....	15	67	1,935	2,875	6,739
Totals, South	103	43,094	41,819	73,905	118	2,637,771	2,236,008	3,685,512
Mid-West—								
Indiana	294	94	32	2,281	90	40,322	44,731	114,086
Illinois	....	....	75	219	76	7,608	9,955	26,851
Kentucky	....	610	....	395	94	46,907	50,075	95,552
Missouri	....	....	5	17	52	7,243	13,977	25,715
Kansas	27	12	45	36	21	300	1,432	1,526
Totals, Mid-West	456	716	157	2,948	85	102,380	120,170	263,730
Grand totals	104	43,810	41,976	76,853	116	2,740,151	2,356,178	3,949,242

*Monthly records of fertilizer tags are kept by State control officials and are slightly larger or smaller than the actual sales of fertilizer. The figures indicate the equivalent number of short tons of fertilizer represented by the tax tags purchased and required by law to be attached to each bag of fertilizer sold in the various States.

†Cottonseed meal sold as fertilizer included.

‡Excludes 27,020 tons of cottonseed meal for January-June combined, but no separation is available for the amount of meal used as fertilizer from that used as feed.

§Revised.

the less common elements, such as magnesium, sodium, silica, titanium, chromium, vanadium, flourine, chlorine, and sulfur. There is also included a bibliography of more than 200 references relating to the subject.

World Nitrogen

World nitrogen production capacity for the year 1932-33, according to a report of a German nitrogen director, by percentage, was as follows:

Atmospheric nitrogen:	
Synthetic ammonia process	66.1
Haber-Bosch	33.15
Casale	10.00
Fauser	8.10
Claude	4.40
N. E. C.	3.90
Mont-Cenis	3.80
Shibata (Japan)	0.05
F. N. R. L	0.10
Unknown	0.15
Cyanamid	10.3
Arc	0.7
By-product ammonia	11.9
Chilean nitrate	11.0

Number of plants employing major processes are: Haber-Bosch, 8; Casale, 26; Fauser, 16; Claude, 19; N. E. C., 15; Mont-Cenis, 7; and Cyanamid, 59.

A. Conrad Jones

A. Conrad Jones, 72, fertilizer veteran, 44 years with I. P. Thomas & Son, Philadelphia, 35 of which he was treasurer, died July 10. He was prominent in civic circles and was a well-known member of the exclusive Philadelphia Union League Club.

R. W. McClellan, sales manager, Ammonia Dept., du Pont, announced appointment of O. F. Jensen as a member of the du Pont sales staff, effective July 15.

Maybank Fertilizer, Charleston, S. C., has been granted a charter by the State to deal in fertilizers. Officers are John F. Maybank, president; David Maybank, vice-president; Thomas B. Bennett, secretary and F. S. Hanckel, treasurer.

According to L'Engrais, following tonnages of Alsatian potash, (K_2O) were sold during last two years:

	1931	*1932*
In France	180,545	189,257
Abroad	174,604	116,632
Total	355,149	305,889

April Sulfuric Production (Fertilizer Manufacturers)

Production of sulfuric by manufacturers of superphosphate in April was 73,900 tons, according to a preliminary report of the Bureau of Census based upon data received from 71 manufacturers. This compared with a revised total of 79,328 tons in March and 60,416 tons in April last year. Stocks on hand at the end of April were 81,884 tons, against 90,701 tons at the end of March, and 77,764 tons at the end of April last year.

	Short tons				
	April 1933†	*March 1933**	*April 1932*	*Jan.-April 1933*	*Jan.-April 1932*
Production and purchases—					
Produced by reporting establishments—					
Totals	73,900	79,328	60,416	367,672	372,566
‡Northern district	51,007	47,978	47,099	226,030	252,308
Southern district	22,893	31,350	13,317	141,642	120,258
Purchased from fertilizer manufacturers—					
Totals	12,222	10,309	6,850	46,950	37,101
Northern district	3,623	5,765	3,203	20,757	16,475
Southern district	8,599	4,544	3,647	26,193	20,626
Purchased from non-fertilizer manufacturers—					
Totals	14,487	8,544	14,021	49,607	50,654
Northern district	7,119	4,933	9,370	32,483	27,845
Southern district	7,368	3,611	4,651	17,124	22,809
Consumed in fertilizer manufacture, and shipments—					
Consumed in reporting establishments in production of fertilizer—					
Totals	71,749	76,573	52,516	337,838	295,233
Northern district	36,534	38,060	31,803	169,528	166,109
Southern district	35,215	38,513	20,713	168,310	129,124
Shipments—					
To other than fertilizer manufacturers—					
Totals	23,612	19,751	23,414	91,576	98,295
Northern district	22,362	17,420	20,762	82,916	82,533
Southern district	1,250	2,331	2,652	8,660	15,762
To fertilizer manufacturers—					
Totals	14,065	14,439	15,267	57,208	84,067
Northern district	9,746	11,764	14,216	40,538	62,944
Southern district	4,319	2,675	1,051	16,670	21,123
Stocks on hand—					
Totals	81,884	90,701	77,764		
Northern district	65,408	72,301	55,711	Not Available	
Southern district	16,476	18,400	22,053		

*Revised.
†Preliminary.
‡Northern district, States north of Virginia-North Carolina line; Southern district, States south of Virginia-North Carolina line.

Textile Chemicals

Industry's Loss

Herbert Warren Reed, 69, who had been engaged in New England dyestuffs industry for 50 years, died July 9 at Arlington, Mass. He started in the dyestuffs industry in 1883 when he became an office boy in Kuttroff, Pickhardt & Co. Remaining with that firm, he ultimately became New England manager and when the company was merged with the General Dyestuff he continued with the latter as manager in Boston. For 16 years he was also manager and a director of the Badische Co. He retired from the General Dyestuff Corp. early in 1926 and recently had been associated with Brown, Anthony & Co. He was president of the Drysalters Club of New England in 1911 and 1912.*

Rhode Island Section Meets

A. A. C. & C.'s Rhode Island Section held its 2nd annual outing July 14 at Warwick Country Club with an attendance in excess of 70. Officers of the Rhode Island Section are: Borden & Remington's Hayward F. Lawton, chairman; C. Brian Wainwright, secretary (Apponaug (R. I.) Co.)

Textile Dyeing & Finishing has been formed by Sanford Cohen, Harold Ickeringill and Priscilla H. Durfee, Providence, and has taken over old Braid Mill in South Attleboro, Mass.

Personnel Changes

Lester Bailey, chemist at the Slater Mills in Webster, Mass., has resigned to become chemist for American Printing, Fall River.

Harry Metcalfe is now with United Chemical Products.

"Zinc Pigments"

National Association of Textile Printing Colorists held its regular meeting in July. H. A. Nelson, from N. J. Zinc, read an instructive paper on "Zinc Pigments."

Color in Industry

Dramatic role that color has played in America's artistic and industrial advancement in past 100 years is vividly expressed in the brochure, "A Century of Progress Colors," just issued by Textile Color Card Association. In this colorful brochure are reproduced brilliant hues appearing on the exteriors of all principal buildings of A Century of Progress International Exposition.

New Dyes

General Dyestuff on July 12 released circular (I. G. 799) describing immediate Brilliant Green 5 G, a new sulfur dyestuff, whose principle feature is its bright, yellowish green shade. This color dyes best at 120-140° F. producing bright yellowish green shades; above this temperature shades are bluer. Its good fastness to washing, water, perspiration, rubbing, hot pressing, mercerizing and alkali deserve special mention for this type of dyestuff.

General Dyestuff has also released Algosol Green 1B Paste. It is a water soluble vat dyestuff like the other brands of the Algosol range. It is recommended for dyeing cotton yarn and silk and especially for direct printing. It yields very bright green shades, having excellent all around fastness properties. Circular Sol. 55 is available.

*In 1926 he was honored at a testimonial dinner by leading dyestuff executives and presented with a wristwatch in token of the esteem in which he was held by friends and competitors. A fellow guest of honor on that occasion was Charles L. Gagnebin, vice-president and co-manager at Boston with Mr. Reed of General Dyestuffs. Gen. Herman A. Metz, president of the company at that time, was toastmaster.

The Financial Markets

Speculation

The 1933 baby speculative bubble burst with a loud bang July 21. Built up largely on purely artificial values of the so-called wet stocks, the market lost all degree of sanity in the week preceeding

Daily Record of Stock Market Trend

N. Y. Herald-Tribune

the crash and ran values up to illogical prices, no matter what yardstick is employed as a measure of value.

Four consecutive days of heavy selling erased all the gains made in the previous month, swiftly brought about in July the first loss in values since the upward movement started last March. This break was followed by a rally, but measured by the action of 240 stocks in 20 of the principal groups listed on the N. Y. Stock Exchange, as compiled by the *N. Y. Times*, the depreciation there was $1,946,872,154, or 9%, contrasted with a gain of $2,418,-817,267, or 13%, in June. A year ago, the market had an advance of 34%, according to the movement of the stocks in this compilation.

Market was started downward by the collapse in prices of the so-called wet stocks. Drastic declines in these issues unsettled it generally.

From March 1 to the end of June there was an appreciation of $10,359,276,693, or 96%, in the market value of the 240 issues used in the *Times* index. Prior to the upturn, or from the end of September, 1929, to the beginning of March of this year, a loss of $40,649,292,577, or 79%, in the market values of the stocks used in this compilation was recorded. Even though the market to the end of June had wiped out all the losses back to October, 1931, the price level of stocks at the end of July was still 63% below that at the end of September, 1929.

Scenes reminiscent of the famous October, 1929, market were enacted once more. Wide spectacular advances were made all along the line, trading volume once more kept Wall Street busy until the "wee" hours, and finally someone "pulled the plug," the plug in this particular market being the so-called wet stocks.

Interpreting The Decline

Fortunately the country has wisely chosen to interpret the collapse for just what it was—a correcting of fictitious values built up by speculative frenzy. The man in the street has refused to believe that the sudden drastic decline is any indication of the actual trend of business.

New Rules

Board of Governors of the N. Y. Stock Exchange and the managing directors of a number of the smaller exchanges throughout the country and also the directors of many of the commodity exchanges (which were naturally affected by the downward course in the market) have taken drastic steps to curtail margin buying by insisting upon higher margin deposits and in several other ways are attempting to prevent wild speculation at a time when business generally is in a very critical period, a period of early convalescence from a very serious and almost fatal illness. Strong intimations of possible investigations, legislation, etc., from Washington undoubtedly spurred the governing boards into their recent action.

Group Losses

Following table shows the groups changes for the past month in the nine general groups:

Group and Number of Issues	*July, 1933* Avr. Net Ch'ge in Points	*July, 1933* Change in Values
Amusements (5)	— .725	— $5,569,376
Building equip (9)	—4.305	— 64,842,722
Business equip. (4)	—5.343	— 40,758,694
Chain stores (14)	—3.232	— 76,916,162
Chemicals (9)	**—2.958**	**—149,136,077**
Coppers (15)	+ .483	— 19,149,649
Depart. stores (10)	—3.437	— 35,169,972
Foods (19)	—3,408	—154,377,408
Leathers (4)	—1,000	— 459,777
Mail order (3)	—4.333	— 56,546,361
Motors (15)	—2.450	—117,177,182
Motor equip. (7)	— .946	— 6,364,124
Oils (22)	—1.943	—369,220,066
Public utilities (29)	—3.767	—521,973,689
Railroads (25)	—2.190	—130,559,630
Railroad equip. (8)	—7.109	— 70,843,287
Rubber (6)	+ .687	+ 4,273,213
Steels (13)	—3.317	—116,712,044
Sugars (9)	— .305	— 2,249,751
Tobaccos (14)	—1.795	— 13,119,396
Average and total 240 issues	—2.576	—$1,946,872,154

Chemical Group

In the chemical group the greatest net losses for the month occurred in du Pont with a loss of 11¼ points and in U.S.I. with a loss of 6¼ points. Columbian Carbon (not in the *Times* compilation) also lost considerable ground. Commercial Solvents, despite its wild gyrations during the month, finally closed with a net gain of 1¼ points, and it with V.C. were the only two stocks in the group of nine to register a net advance in July. Changes in value in the group were as follows:*

Allied Chemical & Dye	$600,322
Commercial Solvents	*3,162,996
Du Pont de Nemours	124,488,956
Mathieson Alkali Works	1,463,481
Texas Gulf Sulphur	13,017,500
Union Carbide & Carbon	10,380,304
U. S. Industrial Alcohol	2,336,537
Virginia-Carolina Chemical	*601,422
Westvaco Chlorine Prod.	613,396
Total	—$149,136,077

The net changes from January through July have been as follows:

	Increases	*Declines*
January	$39,652,757	....
February	....	$168,411,582
March	24,037,138	....
April	403,188,208	....
May	385,593,391	....
June	139,232,100	....
July	....	149,136,077
	$822,292,012	$317,547,659

Thus so far (July 31) the net gain for the year amounts to $514,744,353, which still compares favorably with the net loss of $368,177,263 during 1932, and leaves values still on a plane with the latter part of 1931.

As is customary at this period a large number of half-yearly statements have been released. A summary and comparison of chemical and allied company earnings follows on the next page. Generally speaking, the second quarter of the current year shows up very favorably with the first—in most instances net earnings were greater. Because of the better figures for the April-June quarter many companies are also reporting better six months earnings in this year compared with the same period in 1932.

*Market value of all chemical stocks on the "Big Board" on Aug. 1 amounted to $3,067,927,102, as compared with $3,396,080,507 on July 1 and $2,444,271,453 on June 1. Average price on Aug. 1 amounted to $43.56, as compared with $48.37 on July 1 and $43.93 on June 1. Net loss of value for July amounted to $329,053,405 and net loss on average price amounted to $4.81.

Price Trend of Chemical Company Stocks

	June 31	*July 7*	*July 14*	*July 21*	*July 28*	*Net Change*
Allied	115¼	131½	130	115	117	+ 2¼
Air Reduction	87⅝*	92½	99¼	80⅛	89½	+ 2⅛
Anaconda	16⅛*	20¼	19¾	15½	16¾	+ ⅝
Columbian Carbon	62	67	65	51	52	—10
Commercial Solvents	29¼	28⅞	40⅝	26½	32½	+ 3¼
DuPont	78¾	82⅜	80⅛	66	70½	— 8¼
Mathieson	31	32½	35½	28¾	32½	+ 1½
Monsanto	55½	57¾	62¾	48	56⅜	+ ⅞
Std. N. J.	37½	39⅜	39⅜	33⅞	35⅜	— 2⅛
Texas Gulf	31½	33⅜	33¼	27	26⅞	— 4⅝
U. S. I.	60¼	69	85⅛	46	56½	— 3¾

*ex rights.

Additional Shares Listed

Three alcohol companies and one chemical company have been granted permission by N. Y. Stock Exchange to list for trading additional shares of their stock. American Commerical Alcohol will add 15,000 common shares on notice of the exchange for 2,700 preferred and 3,900 common of Noxon, Inc., manufacturer of insecticides and polishes, with which it has a 10-year contract for solvents.* U. S. I. will issue 15,000 additional shares for purchase of stock in Penn-Mar-Kentucky, Inc., which latter will be jointly owned by U. S. I. and National Distillers. It will also issue up to 15,000 shares for properties to be purchased. Commercial Solvents is listing 105,000 more common shares to cover purchase of certain properties of Rossville. Monsanto will list 3,000 additional common shares to be issued for purchase of some property of an undisclosed nature.

Archer-Daniels Offer Approved

Commander-Larabee protective committee for first mortgage 6% 15-year bonds and 10-year 7% notes has approved offer of Archer-Daniels-Midland to purchase all bonds and notes deposited with committee at a price of $600 flat for each $1,000 principal amount of bonds and $300 flat for each $1,000 principal amount of notes. These prices are net to depositors, without deduction for fees, expenses or transfer taxes. Offer is subject to certain conditions. Assent of at least 80% of the deposited bonds and notes to the purchase may be required, although Archer-Daniels-Midland reserves right to accept a lesser amount. Delivery was required not later than July 29.

Manganese Stock-holders Assent

Cuban-American Manganese stock-holders (Freeport Texas subsidiary) ratified June 30 a proposal to create 350,000 shares of 8% cumulative convertible preferred stock, par $2. They also ratified an increase in the authorized common stock to 700,000 shares from 350,000 to provide for conversion of new preferred shares. Stockholders of record July 3 obtained right to subscribe to new preferred shares at par on a share for share basis, this right expiring July 14. New preferred issue will be under written by Freeport Texas, according to the agreement.

Monsanto Retires

Monsanto Chemical announces retirement on Sept. 30, 1933, of two hundred thousand dollars ($200,000.00) face value of its 5½% First Mortgage Sinking Fund Gold Bonds due 1942. This redemption is in addition to sinking fund retirements which are being met annually. Expansion of business and ample liquid resources warrant the anticipation of a substantial part of Monsanto's funded debt.

*American Commercial in the agreement acquires rights to new agricultural and horticultural plant spray which the company believes can be marketed profitably. Sprays are 85% alcohol.

†Consolidated Lead is now virtually a holding company, its assets consisting of 80,000 common shares of Eagle-Picher Mining & Smelting accepted last year in exchange for its mining properties. Eagle-Picher Mining & Smelting, in turn, is a subsidiary of Eagle-Picher Lead.

Dividends and Dates

Name	Div.	Stock Record	Payable
Air Reduction	.75	June 30	July 15
Allied Chemical	$1.50	July 11	Aug. 1
Amer. Home Prods.	.25	Aug. 14	Sept. 1
Archer-Daniels pf	$1.75	July 21	Aug. 1
Atlas Powder, pf	$1.50	July 20	Aug. 1
Clorox Chemical	.50	Sept. 20	Oct. 1
Clorox Chemical	.50	Dec. 20	Jan. 1
Consol Chem Ind pf A	.37½	July 15	Aug. 1
Corn Products	.75	July 3	July 20
Corn Products, pf	$1.75	July 3	July 15
Dow Chemical	.50	Aug. 1	Aug. 15
Dow Chemical, pf	$1.75	Aug. 1	Aug. 15
Freeport Texas, pf	$1.50	July 14	Aug. 1
Freeport Texas	.50	Aug. 15	Sept. 1
Freeport Texas 6% pf	$1.50	Oct. 13	Nov. 1
Hercules Powder, pf	$1.75	Aug. 4	Aug. 15
Int'l Nickel, pf	$1.75	July 3	Aug. 1
Lehn & Fink	.50	Aug. 15	Sept. 1
Nat. Carb., pf	$2.00	July 20	Aug. 1
Nat. Lead B pf	$1.50	July 21	Aug. 1
Nat. Lead	$1.25	Sept. 15	Sept. 30
Nat. Lead, pf A	$1.75	Sept. 1	Sept. 15
Nat. Lead, pf B	$1.50	Oct. 20	Nov. 1
Penn Salt Mfg.	.75	June 30	July 15
Procter & Gamble	.37½	July 25	Aug. 15
Sherwin-Williams, pf	$1.50	Aug. 15	Sept. 1
Sherwin-Williams	.25	July 31	Aug. 15
Solvay Amer. Invest. pf	$1.37½	July 15	Aug. 15
Texas Gulf Sulphur	.25	Sept. 1	Sept. 15
Vulcan Detinning, pf	$1.75	Oct. 6	Oct. 20
Vulcan Detinning, pf	$1.75	July 7	July 20

Propose To Dissolve

Consolidated Lead stockholders will be requested to vote Sept. 15 on proposals to dissolve company and accept in exchange for their holdings, stock of Eagle-Picher Lead.†

Westvaco Offer

Pursuant to application dated May 29, 1933, Committee on Stock List of the N. Y. Stock Exchange authorized modification of the terms of authorization for listing of remainder of 102,000 shares pursuant to an offer made by United Chemicals, for exchange of one share of Westvaco Chlorine common for one share of United pref. stock outstanding for the period ending July 8, 1933, "with the privilege of extending said right of exchange to Sept. 8, 1933." On the above authorization, officers of United Chemicals, Inc. extended this exchange to and including July 25.

V.-C. 7% Purchase

V.-C. is offering to buy from holders of its 7% cumulative stock all or any part of their holdings at not more than $60 per share to a maximum amount of 10,000 shares. If more than that amount of stock is offered shares purchased at highest price will be prorated and preference will be given to offers of 10 shares and less. Stockholders of record July 19 may offer stock.

Westvaco Chlorine has called for payment Aug. 28, at 101½ and interest, $86,000 of its 5.5-per cent. debentures due March 1, 1937.

Permission To Sell

Pacific Dry Ice, San Francisco, has been authorized by California Corporation Commission to sell 9,000 preferred and 3,000 common shares in units of three and one at $10 a unit, and to allot 12,000 common shares as consideration in transactions for leases. Company's capitalization is 75,000 Shares of $3 par preferred stock and 125,000 shares of no-par common.

Chemical Holdings

Spencer Trask Fund, Inc., portfolio on June 30 included following chemical allied company stocks:

Shares	Company
1,800	Air Reduction Co., Inc.
5,000	Allied Chemical & Dye Corp.
9,000	American Cyanamid Co., cl. B.
1,000	Drug Inc.
3,600	Inter. Nickel Co. of Can., Ltd.
3,500	Socony Vacuum Corp.
2,500	Southern Pacific Co.
5,400	Standard Oil Co. (N. J.)
5,000	Texas Gulf Sulphur Co.
5,400	Union Carbide & Carbon Corp.

Dividend Changes

Penick & Ford, Ltd., Inc., had declared a quarterly dividend of 50c. Directors also declared an additional 50c to make new rate apply from Jan. 1, 1933. During first two quarters of the current year dividends of 25c each were declared. Dividends are payable Sept. 15 to stock of record Sept. 1. Following the meeting it was stated that the directors felt retirement of all prior securities now made it possible for the company to distribute a greater percentage of its earnings than in the past.

Sherwin Williams declared a dividend of 25c on common, payable August 15 to stock of record July 31. Common dividend was omitted last quarter. Six months ago 25c was paid. Regular quarterly dividend of $1.50 on preferred was also declared, payable Sept. 1 to stock of record Aug. 15.

Standard Wholesale Phosphate & Acid (Baltimore fertilizer and sulfuric producer) has declared regular quarterly dividend of 1½% on 6% stock. President Whiting reports net earnings four times dividend rate.

Foreign Markets

	June 30	July 31
London		
British Celanese	17s 6d	16s 9d
Celanese	£13	£7¾
Courtaulds	£1⅞	£1⅞
Distillers	68s 3d	79s 3d
Imperial Chemical	26s 10½d	29s 7½d
Un. Molasses	8s 9d	13s 9d
Paris		
Kuhlmann	640	650
L'Air Liquide	840	810
Berlin		
I. G. Farben	129	132
Milan		
Italgas		
Montecatini	112¾	109
Snia Viscosa	179	164½

Over the Counter Prices

	June 30		July 31	
J. T. Baker	..	..	..	..
Dixon	35	42	49	54
Merck, pfd	97	100	96½	100½
Worcester Salt	44½	48½	48	53
Young, J. S., pfd	81	..	58½	..
Young, J. S., com	54	..	86	..

Earnings at a Glance

Company	Annual Dividends	Net Income 1933	Net Income 1932	Common Share Earnings 1933	Common Share Earnings 1932
Atlas Powder:					
June 30 quarter	f....	$137,288	†$75,168	$.08	...
Six months, June 30	f....	129,257	†154,398	p1.46	...
Commercial Solvents:					
June 30 quarter	.60	412,290	295,820	.16	.12
Six months, June 30	.60	637,048	589,274	.25	.23
Corn Products Refining:					
June 30 quarter	3.00	3,090,116	2,042,208	1.05	.63
Six months, June 30	3.00	5,188,729	4,153,381	1.70	1.29
du Pont de Nemours:					
June 30 quarter	2.00	8,974,743	4,512,988	j.68	j.27
Six months, June 30	2.00	14,455,258	14,202,421	j1.03	j1.01
Hercules Powder:					
June 30 quarter	1.50	666,072	213,011	h.83	h.04
Six months, June 30	1.50	893,050	300,216	.90	p2.82
Industrial Rayon:					
June 30 quarter	3.00	456,865	†292,461	h2.28	...
Six months, June 30	3.00	686,241	†114,812	h3.43	...
Matheison Alkali Works:					
June 30 quarter	1.50	330,841	171,929	.46	.20
Six months, June 30	1.50	503,682	422,215	.67	.52
Monsanto Chemical Co.:					
June 30 quarter	1.25	542,027	258,361	1.27	.60
Six months, June 30	1.25	838,947	534,221	1.96	1.24
Penick & Ford:					
June 30 quarter	1.00	441,916	125,392	1.10	.31
Six months, June 30	1.00	697,590	274,409	1.74	.68
Texas Gulf Sulphur:					
June 30 quarter	1.00	1,437,861	1,384,423	.57	.54
Six months, June 30	1.00	2,414,565	3,106,958	.95	1.22
Union Carbide & Carbon:					
June 30 quarter	1.00	2,642,745	2,254,997	.29	.25
Six months, June 30	1.00	4,301,210	4,236,437	.47	.47
U. S. Industrial Alcohol:					
Five months, May 31	f...	214,718	*......	.57	...

fNo common dividend. †Net loss. pOn preferred stock. jOn average shares. hOn shares outstanding at close of respective periods. *Not available.

Company Reports

Mathieson Alkali, reports for quarter ended June 30, 1933, net income of $330,841 after depreciation, depletion, federal taxes, etc., equivalent after dividend requirements on 7% preferred, to 46c a share on 623,308 shares of no-par common. This compares with $172,841 or 21c a share on 623,333 common shares in preceding quarter and $171,929 or 20c a share on 650,436 common shares in June quarter of previous year.

For six months ended June 30, 1933, net income was $503,682 after charges and taxes, equal to 67c a share on 623,308 common shares comparing with $422,215 or 52c a share on 650,436 common shares in first half of 1932.

Income account for quarter ended June 30, 1933, compares as follows:

	1933	1932	1931	1930
Oper profit	$654,472	$454,366	$689,168	$922,048
Depr & depl	283,951	285,593	284,681	301,290
Profit	$370,521	$168,773	$404,487	$620,758
Oth inc (net)	*6,611	11,789	10,818	14,891
Total inc.	$363,910	$180,562	$415,305	$635,649
Federal tax	33,069	8,633	37,159	69,962
Net income	$330,841	$171,929	$378,146	$565,687

Six months ended June 30:

	1933	1930	1931	1930
Oper profit	$1,134,915	$992,952	$1,294,308	$1,788,460
Depr & depl	567,939	571,934	569,745	582,929
Profit	$566,976	$421,018	$724,563	$1,205,531
Oth inc (net)	*10,264	26,266	21,886	35,815
Total inc.	$556,712	$447,284	$746,449	$1,211,346
Federal tax	53,030	25,069	70,900	133,713
Net income	$503,682	$422,215	$675,549	$1,107,633

*Debit.

Owens-Illinois Glass and subsidiaries report for 12 months ended June 30, 1933, net profit of $4,208,499 after depreciation, interest, federal taxes and other charges, equivalent after dividends on 6% preferred during period it was outstanding, to $3.14 a share (par $25) on 1,200,000 shares of common. This compares with $1,830,229 or $1.46 a share on 922,173 common shares in 12 months ended June 30, 1932.

Du Pont Earnings Show Sharp Rise

Du Pont and wholly owned subsidiaries for quarter ended June 30, shows net income of $8,974,743, after depreciation, obsolescence, interest, federal taxes, etc., comparing with $5,480,515 in preceding quarter and $4,512,988 in June quarter of previous year. After deducting debenture dividends and including $114,554 equity in undivided profits or losses of controlled companies not consolidated, there was a balance available for common stock in quarter ended June 30, last, of $7,452,122, equivalent to 68c a share (par $20) on 10,964,148 average number of common shares outstanding during the period.

In preceding quarter, balance for common including $21,937, company's proportion of losses of controlled companies not consolidated, was $3,825,428, equal to 35c a share on 10,871,977 average common shares, and in June quarter of 1932, balance for common stock, including $15,749 equity in undivided profits or losses of controlled companies not consolidated, was $2,903,033, or 27c a share on 10,814,210 average common shares.

For six months ended June 30, 1933, net income was $14,455,258, after taxes and charges, comparing with $14,202,421 in first half of previous year. After deducting debenture dividends and including $92,617 equity in undivided profits or losses of controlled companies not consolidated, there was a balance for common stock in first half of 1933 of $11,277,550, equal to $1.03 a share on 10,918,063 average common shares. In first six months of 1932, balance for common stock, including $19,094 equity in undivided profits or losses of controlled companies not consolidated, was $10,962,167, or $1.01 a share on 10,878,989 average common shares.

Earnings for June quarter this year include dividends from G. M. Investment amounting to 23c a share on du Pont common comparing with 23c a share in preceding quarter and 23c a share in June quarter of 1932. For six months ended June 30, this year, earnings from G. M. investment amounted to 46c a share on du Pont common against 68c a share in first half of 1932.

Consolidated income account for quarter ended June 30, 1933, compares as follows:

	1933	1932	1931	1930
Oper inc	$9,256,382	$4,224,483	$10,094,621	......
Depr & obsol	3,204,887	3,223,672	3,109,994	......
Balance	$6,051,495	$1,000,811	$6,984,627	$7,957,036
Inc. G. M. inv	2,499,361	2,494,667	7,487,465	7,484,000
Other inc	1,541,059	1,118,382	1,293,337	1,016,591
Total inc	$10,091,915	$4,613,860	$15,765,429	$16,457,627
Fedl tax	1,099,766	83,268	793,868	835,773
Interest	17,406	17,604	18,096	18,166
Net income	$8,974,743	$4,512,988	$14,953,465	$15,603,688
Deb divs	1,637,175	1,625,704	1,492,995	1,492,978
Com divs	5,475,306	8,124,042	11,065,671	10,709,706
Surplus	$1,862,262	*$5,236,758	$2,394,799	$3,401,004

*Deficit.

Consolidated income account for six months ended June 30, 1933, compares as follows:

	1933	1932	1931	1930
Oper inc	$14,849,073	$11,388,994	$17,414,188	......
Depr & obsol	6,428,008	6,527,055	6,158,982	......
Balance	$8,421,065	$4,861,939	$11,255,206	$14,705,317
Inc G. M. inv	4,998,723	7,484,000	14,971,465	17,965,065
Other inc	2,419,463	2,380,959	2,525,841	2,025,373
Total inc	$15,839,251	$14,726,898	$28,752,512	$34,695,755
Fedl tax	1,349,162	488,885	1,105,885	1,708,063
Interest	34,831	35,592	36,233	36,378
Net inco	$14,455,258	$14,202,421	$27,610,394	$32,951,314
Deb divs	3,270,325	3,259,348	2,985,990	2,985,957
Com divs	10,911,256	19,081,491	22,128,755	24,166,861
Surplus	$273,677	‡$8,138,418	$2,495,649	$5,798,496
Surp Dec. 31	178,717,373	198,933,044	208,082,665	144,920,215
Com stock prem	....	....	3,120	....
Rev GM inv	†14,500,000	†9,981,220	....	22,457,745
Surp adj	§4,023,149	....	....	*14,107,619
P & L surp	$168,514,199	180,813,406	210,581,434	187,284,075

*Consists of $7,767,060 surplus resulting from issue of common stock sold under executives' trust and bonus plans, and $6,340,559 surplus resulting from acquisition of R & H. †The value of du Pont company's investment in G. M. Corp. common stock was adjusted on the books of the company in March, 1932, to $168,682,618, ($16.90 a share) and in March, 1933, to $154,500,000 ($15.45 a share), which closely corresponded to its net asset value as shown by the balance sheets of G. M. Corp. as of Dec. 31, 1931, and Dec. 31, 1932, respectively. ‡Deficit. §Adjustment resulting from disposition of common stock in treasury.

Texas Gulf Reports Net of $1,437,861

Texas Gulf Sulphur, reports for quarter ended June 30, 1933, net income of $1,437,861 after depreciation and federal taxes, but before depletion, equivalent to 57c a share on 2,540,000 shares of no-par stock. This compares with $976,704 or 38c a share in preceding quarter and $1,384,423 or 54c a share in June quarter of previous year.

For six months ended June 30, 1933, net income was $2,414,565 before depletion, equal to 95c a share comparing with $3,106,958 or $1.22 a share in first half of 1932.

During last quarter, company increased its reserves for depreciation and accrued federal taxes, by $119,593 making total of these reserves $13,715,918 on June 30, last.

Statement for quarter ended June 30, compares as follows:

	1933	*1932*	*1931*	*1930*
*Net in	$1,437,861	$1,384,423	$1,939,967	$3,648,345
Dividends	635,000	1,270,000	1,905,000	2,540,000
Surplus	$802,861	$114,423	$34,967	$1,108,345
†P & L sur	27,863,305	26,455,206	28,143,810	23,760,607

Six months ended June 30:

	1933	*1932*	*1931*	*1930*
*Net in	$2,414,565	$3,106,958	$4,388,165	$7,452,046
Dividends	1,270,000	2,540,000	4,445,000	5,080,000
Surplus	$1,144,565	$566,958	‡$56,835	$2,372,046

*After depreciation and federal taxes. †Including reserve for depletion. ‡Deficit.

Consolidated Chemical Industries, reports, for six months ended June 30, 1933, net profit of $175,409, after depreciation, federal taxes, etc., equivalent to 85c a share on 205,000 no-par shares of $1.50 Class A preferred stock. This compares with $157,320, or 77c a share on Class A preferred, in first half of 1932. Class B common, of which there are 80,000 no-par shares, is closely held.

For quarter ended June 30, 1933, net profit was $96,935, after taxes and charges, equal to 47c a share on Class A preferred, comparing with $78,474, or 38c a share, in preceding quarter, and $77,751, or 38c a share in June quarter of previous year.

Corn Products Has Favorable Half Year

Corn Products Refining reports for six months ending June 30, 1933, net income of $5,188,729 after interest, depreciation, federal taxes, etc., equivalent after dividend requirements on 7% preferred stock, to $1.70 a share (par $25) on 2,530,000 shares of common. This compares with $4,153,381 or $1.29 a share on common in first half of 1932.

For quarter ended June 30, 1933, net income was $3,090,116 after charges and taxes, equal to $1.05 a share on common comparing with $2,098,613 or 65c a share in preceding quarter and $2,042,208 or 63c a share in June quarter of previous year.

	1933	*1932*	*1931*	*1930*
*Net earn	$4,822,032	$3,744,832	$4,617,441	$6,851,193
Other income	1,460,847	1,652,699	2,271,201	1,347,465
Total inc.	$6,282,879	$5,397,531	$6,888,642	$8,198,658
Int & depr	1,094,150	1,244,150	1,394,375	1,557,397
Net income	$5,188,729	$4,153,381	$5,494,267	$6,641,261
Pfd divs	875,000	875,000	875,000	875,000
Com divs	3,795,000	3,795,000	5,060,000	5,060,000
Surplus	$518,729	†$516,619	†$440,733	$706,261
P & L surp	24,526,037	24,069,050	24,040,161	......

*After expenses estimated federal taxes, etc. †Deficit.

American Potash and Chemical and subsidiaries report net income of $105,965 after depreciation, interest, loss on foreign exchange and other charges for the year ended Dec. 31, 1932. This equals 20c per share on 528,390 capital shares, compared with $1,463,145, or $2.77 a share, in 1931.

Southern Acid and Sulphur reports net profit of $92,945 for the fiscal year ended March 31, 1933, after all charges. This was equal to 34c a share on 45,471 common shares, after 7% preferred dividends. It compared with a net of $89,047, or 8c a share on 48,291 common shares in year ended Dec. 31, 1931.

Newport Industries Shows Small Profit

Newport Industries, Inc., and subsidiaries, report for quarter ended June 30, net profit of $4,660 after depreciation, interest and other charges, comparing with net loss of $15,354 in preceding quarter and net loss of $79,042 in June quarter of previous year.

For six months ended June 30, 1933, net loss was $10,694 after depreciation, interest, etc., against net loss of $135,583 in first half of 1932.

In June quarter of 1933, idle plant expenses amounting to $16,079 were charged against reserve previously created for that purpose and proportion of losses of affiliated company of $18,190 was charged to deficit account. This compares with similar charges of $23,408 and $27,563 respectively, in preceding quarter and $9,634 and $47,492 respectively in June quarter of previous year. For the six months ended June 30, 1933, these charges amounted to $39,487 and $45,753 respectively, comparing with $40,763 and $76,909 in first half of 1932.

Consolidated income account for quarter ended June 30, 1933, compares as follows:

	1933	*1932*
Sales, net	$659,100	$467,250
Cost and expenses	609,085	488,388
Profit	$50,015	†$21,138
Depreciation	47,754	46,655
Interest and other charges, net	3,368	15,982
Loss	$1,107	$83,775
Profit on sale of stock	4,849	†8,141
Dividends received	918	12,874
*Net profit	$4,660	†$79,042

*Exclusive of idle plant expenses of $16,079 charged against reserve previously created for that purpose, in 1933 and $9,634 in 1932 and proportion of losses of affiliated company amounting to $18,190 charged to deficit account in 1933 and $47,492 in 1932. †Loss.

Carbide Tops 1932 Earnings

Union Carbide & Carbon and subsidiaries report for quarter ended June 30, net profit of $2,642,745 after interest, taxes, depreciation and preferred dividends of subsidiaries, equivalent to 29c a share on 9,000,743 no-par shares of stock. This compares with $1,658,465 or 18c a share in preceding quarter and $2,254,997 or 25c share in June quarter of previous year.

For six months ended June 30, net profit was $4,301,210 after charges and subsidiary preferred dividends, equal to 47c a share, comparing with $4,236,437 or 47c a share in first half of 1932.

Consolidated income account for quarter ended June 30, 1933, compares as follows:

	1933	*1932*	*1931*	*1930*
Net aft fed tax	$4,602,888	$4,303,045	$6,640,750	$8,602,073
Int & sub pf divs	300,745	306,612	317,466	321,999
Depr., etc.	1,659,398	1,741,436	1,817,129	1,973,272
Net profit	$2,642,745	$2,254,997	$4,506,155	$6,306,802

Six months ended June 30:

	1933	*1932*	*1931*	*1930*
Net aft fed tax	$8,209,128	$8,318,824	$13,384,163	$17,357,238
Int & sub pf divs	603,115	614,416	628,483	630,439
Depr., etc.	3,304,803	3,467,971	3,635,855	3,947,214
Net profit	$4,301,210	$4,236,437	$9,119,825	$12,779,585

Air Reduction, reports net profits for June quarter of $720,485, equal to 85c a share on 841,288 shares of common. This compares with net profits of $432,427, or 45c a share, for the first quarter of the year, and with $588,997, or 70c a share, for the second quarter of last year. Company's gross business amounted to $3,347,193, against $2,770,487 in the first quarter, and against $3,142,243 in the June quarter of last year. For the first half of the year company's net was $1,152,912, or $1.30 per share, against $1.50 dividend requirements, compared with $1,307,937, or $1.48 a share, for first half of 1932.

U. S. I. reports for six months ended June 30, net profit of $299 155 after expenses, reserve for replacements and federal taxes, equivalent to 80c a share on 373,846 no-par shares of capital stock. This compares with $32,967 or 9c a share in first half of 1932. Income account for six months ended June 30, 1933, follows: Gross operating income $1,050,177; operating expenses $590,733; net operating income $459,444; reserve for replacements $160,289; net profit $299,155.

The Industry's Securities

Last	1933 July High	July Low	1933 High	1933 Low	1932 High	1932 Low	Sales In July	Sales During 1933	Stocks	Par $	Shares Listed	An. Rate		Earnings $-per share-$ 1931	1930
NEW YORK STOCK EXCHANGE															
89½	103¼	80½	103¼†	47½	63½	30⅞	68,000	506,300	Air Reduction	No	841,288	$3.00		4.54	6.32
116	135	108½	135†	70¾	88¼	42½	206,200	2,051,700	Allied Chem. & Dye	No	2,401,000	6.00		6.74	9.77
122	123⅝	119	123⅝†	115	120†	96½	4,600	24,200	7% cum. pfd.	100	393,000	7.00			
26⅞	35	21¼	35†	7¼	15½	3½	77,900	199,500	Amer. Agric. Chem.	100	333,000		Yr. Je. '30		Nil
42	89⅞	29⅛	89⅞†	13	27	11	601,400	1,399,300	Amer. Com. Alc. (new)	20	375,000				d1.27
27¾	29¼	22½	29¼†	9¾	15½	7	21,200	83,300	Archer Dan. Midland	No	550,000	1.00	Yr. Aug. 30		1.68
28¼	39⅛	24½	39⅛†	9	25½	7*	18,600	113,600	Atlas Powder Co.	No	261,438			.59	2.67
78⅝	81½	78⅝	81½†	60	79½	45½	1,360	5,174	6% cum. pfd.	100	96,000	6.00			
52	71½	48½	71½†	23⅛	41⅞	13½	84,900	766,800	Columbian Carbon	No	538,420	2.00		3.02	5.04
31½	57¼	24½	57¼†	9	13¾	3½	284,700	3,115,500	Comm. Solvents	No	2,530,000	.60		.83	1.07
78	85⅞	73	85⅞†	45⅞	55⅜	24¾	118,900	1,267,100	Corn Products	25	2,530,000	3.00		3.54	4.82
139	139½	133½	145¼	117½	140	99½	1,240	7,200	7% cum. pfd.	100	250,000	7.00			
70	85¾	60	85¾†	32⅛	59¾	22	791,560	4,574,060	DuPont de Nemours	20	11,008,512	2.00		4.29	4.67
112	117	112	117†	97½	105⅛	80¾	2,700	34,200	6% cum. deb.	100	1,098,831	6.00			
77	89¾	65½	89¾†	46	87¾	35¼	65,100	470,118	Eastman Kodak	No	2,261,000	3.00		5.78	8.84
...	125	121	130	110	125	99	140	1,430	6% cum. pfd.	100	62,000	6.00			
37½	42⅝	33½	42⅝†	16⅛	28⅝	10	118,200	557,600	Freeport Texas Co.	No	730,000	2.00		3.26	w4.77
46	63	40	63†	15	29½	13⅞	20,200	212,500	Hercules Powder Co.	No	606,234	1.50		1.04	2.61
107	109	105	110†	85	95	70½	630	3,320	7% cum. pfd.	100	114,241	7.00			
3⅞	5⅜	3⅛	5⅜†	⅞	3½	¼	63,700	139,600	Intern. Agric.	No	450,000		Yr. Je.'30		1.68
20	27½	15	27½†	5	15	3¾	8,900	21,300	7% cum. prior pfd.	100	100,000	7.00	Yr. Je. '30		14.58
17¾	22	14¾	22†	6¾	12½	3½	1,469,800	5,375,037	Intern. Nickel	No	14,584,000			.22	.67
16	22	14	22†	7½	11	8	15,200	53,200	Kellogg (Spencer)	No	598,000	.60			h1.14
32	50	21	50†	10¼	22	9	224,000	690,000	Liquid Carbonic Corp.	No	342,000			2.96	5.22
...	38¾	28¾	38¾†	14	20⅞	9	101,700	363,400	Mathieson Alkali	No	650,426	1.50		1.88	2.96
...	...	...	105	100⅛	105	89¾		240	7% cum. pfd.	100	24,610	7.00			
56⅜	67¼	48	67¼†	25	30¾	13⅜	30,400	134,766	Monsanto Chem.	10	429,000	1.25		2.98	1.73
75	124⅞	64¾	124⅞†	16⅞	27¼	13	1,033,100	2,775,900	National Dist. Prod. cts. (new)	No	252,000			—	1.23
109	125	109	125†	43¼	92	45	2,300	22,900	National Lead	100	310,000	5.00			7.58
...	125	123	125†	101	125	87	800	4,755	7% cum. "A" pfd.	100	244,000	7.00			
100½	109⅛	99¾	109⅛†	75	105	61	700	2,730	6% cum. "B" pfd.	100	103,000	6.00			
6⅛	6⅞	4¼	6⅞†	1⅞	4⅜	1	36,500	128,100	Tenn. Corporation	5	858,204	1.00			1.21
26⅝	34⅞	25	34⅞†	15¼	26¾	12	146,700	932,100	Texas Gulf Sulphur	No	2,540,000	2.00		3.52	5.50
42	51⅞	36⅝	51⅞†	19¾	36⅜	15½	347,700	1,893,000	Union Carbide & Carb.	No	9,001,000	1.20		2.00	3.12
23¼	30⅝	20¼	30⅝†	10¼	18	6⅝	95,100	494,600	United Carbon Co.	No	398,000			—	1.43
54	94	41	94†	13½	36¼	13¼	621,400	1,699,500	U. S. Ind. Alc. Co.	No	373,846			—	z2.96
24¾	36¼	20½	36¼†	7⅝	23¾	5¼	328,900	982,600	Vanadium Corp. of Amer	No	378,367				2.95
4¾	7⅜	3	7⅜†	⅜	2⅜	½	206,600	322,200	Virginia Caro. Chem.	No	487,000		Yr. Je. '30		Nil
19¾	26½	15	26½†	3⅜	11¼	3⅛	27,600	73,100	6% cum. part. pfd	100	213,000		Yr. Je. '30		2.63
59¼	63½	58⅝	63½†	35⅜	69¾	20	2,800	10,720	7% cum. prior pfd	100	145,000		Yr. Je. '30		11.96
16	20½	14	20½†	5	12⅜	1	22,500	84,700	Westvaco Chlorine Prod.	No		1.00		1.79	2.51
NEW YORK CURB															
11¼	14⅞	9	15⅝	3¼	8½	1⅝	162,800	837,700	Amer. Cyanamid "B'	No	2,404,000			.21	
3⅞	4¼	3	4½	1	2⅛	¾	104,700	133,100	Brit. Celanese Am. Rcts	2.43	2,806,000				
...	110	97¾	110†	27	55	8	1,950	24,415	Celanese 7% cum. part. 1st pfd.	100	148,000	7.00			
...	85	82	86½	51	64½	17	1,225	8,145	" 7% cum. prior pfd.	100	115,000	7.00			
...	15½	7	16¾	2	5⅞	1⅛	4,400	37,300	Celluloid Corp.	No	195,000				
9	10½	8	10½†	4⅛	6⅛	4½	61,500	100,300	Courtaulds, Ltd.	1£					
62½	78	57¾	78†	30	39	21½	12,000	35,600	Dow Chemical	No	630,000	2.00			3.44
...	2½	2	2½	½	1½	½	4,800	22,400	Duval Texas Sulphur	No	500,000				
...	15¼	14	17	8	...	...	1,000	4,300	Heyden Chemical Corp.	10	150,000	1.00			
7	7	7	7†	4¼	2½	2½	50	1,050	Imperial Chem. Ind.	1£				1.21	
...	20⅛	14¼	20⅝†	8	20⅛	6¼	5,400	25,150	Shawinigan W. & P.	No	2,178,000	1.00			
CLEVELAND STOCK EXCHANGE															
24	24	24	24	22	25	21¾	222	811	Cleve-Cliffs Iron $5 pfd.	No	498,000	5.00		—	11.42
60	78	59	78†	30	40	21½	1,575	10,206	Dow Chemical Co.	No	630,000	2.00			3.44
...	...	...	98¾	96	...	...		225	Dow Chemical Co., pfd.	100	3,000,000	7.00			
134	135	133	135†	110	...	...	199	1,791	National Carbon, pfd.	100	5,600,000	7.00			
PHILADELPHIA STOCK EXCHANGE															
...	48	43	48†	25¼	40	19¾	775	3,535	Pennsylvania Salt	50	150,000	3.00	Yr. Je. '30		7.97

Last	1933 July High	July Low	1933 High	1933 Low	1932 High	1932 Low	Sales In July	Sales During 1933	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE													
...	92½	89¼	94¾	70½	80	62	396	646	Amer. Cyan. deb. 5s	1942	5	A. O.	4,554,000
86	89	84	89†	64	80	54½	346	2,207	Amer. I. G. Chem. conv. 5½s.	1949	5½	M. N.	29,933,000
...	14⅛	7⅛	14⅛	2⅛	18	1	356	946	Anglo-Chilean s. f. deb. 7s.	1945	7	M. N.	14,600,000
...	72½	64	74⅞	37	60	34½	45	302	By-Products Coke Corp. 1st 5½s "A"	1945	5½	M. N.	6,629,000
...	103½	102⅞	104½	101	104⅞	100⅝	23	307	Corn Prod. Refin. 1st s. f. 5s.	1934	5	M. N.	1,822.000
...	64	52	64†	38½	54⅞	32	30	217	Int. Agric. Corp. 1st coll. tr. stamped to 1942	1942	5½		
10	14⅞	9	14⅞†	2½	15¼	½	919	27,335	Lautaro Nitrate conv. 6s.	1954	6	J. J.	32,000,000
93¼	93¼	87¾	98½	37¼	97¾	67	53	534	Montecatini Min. & Agric. deb 7s with warrants	1937	7	J. J.	8,188,000
40⅜	42	30⅛	63	33¾	59	17	36	281	Ruhr chemical s. f. 6s.	1948	6	A. O.	3,578,000
98⅝	99½	97	99½†	87	90	66	187	796	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
74	74	74	...	...	66	39	5	191	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000
73⅞	81	67¾	81†	34¾	75	30	210	1,317	Vanadium Corp. conv. 5s	1941	5	A. O.	5,000,000
NEW YORK CURB													
73¼	80½	70	80½†	49	76	55	324,000	2,538,000	Shawinigan W. & P. 4½s. "A"	1967	4½	A. O.	35,000,000
...	80½	70	80½†	50	76	55	214,000	1,259,000	4½s., series "B"	1968	4½	M. N.	16,108,000
102½	103⅛	102½	103½	101	103⅛	99	10,000	76,000	Westvaco Chlorine Prod. 5½s	1937	5½	M. S.	1,992,000

h 11 mos. ending Aug. 30 w 13 mos.; Before inventory adjustment; *New Low; †New High

The Trend of Prices

Business Continues to Improve

Trade has withstood beautifully the combined shocks of a stock and commodity markets crash of no mean proportion and a heat wave that spread an enervating hot blast over the major portion of the U. S., lasting for a week or more. Retail trade except in a few more or less isolated cases appears to have registered further improvement. Certain it is that many thousands are again back to work under the beneficent wings of the "Blue Eagle," and that the country's spending power, because of the N.R.A. re-employment plans and widespread salary advances, is constantly increasing at an encouraging pace.

Wholesale trade in some lines experienced a slight slackening of demand in the last part of the month. This is not unusual, nor alarming. Even with this decline trade is still moving contrary to the general seasonal trend, and with the traditional "after Labor Day" period less than 30 days away, further sturdy advances are confidently looked for shortly.

In the so-called heavy industries the picture is still very encouraging.

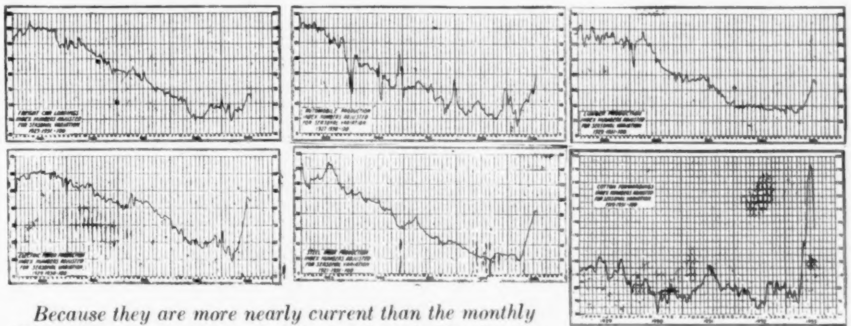
Steel operations increased (Aug. 4) after two weeks of minor recessions, the rate (55-60% of capacity) now being at about the 1930 level. Freight loadings, while showing very slight recessions in certain of the weeks in July, again showed an increase in the last week and exceeded last year's total by 29.2%. Lumber output was the heaviest since June 1931. Electricity output continued to run ahead of last year's figures. Cotton was less active and a letup in most of the textile lines was apparent, but it is strongly felt that this is purely seasonal. Automobile production in July again passed the 200,000 unit mark, and indications point to August winding up with a similar record. Building continued to show improvement, and with a stupendous public works program in the offing the outlook is better than it has been since early in 1930.

Certain commodity prices are, of course, lower than they were before the crash which started July 21. Still, some of the ground has already been made up. Fisher's Index stood on June 30 at 65.1 and on Aug. 4 at 70.6. Some loss occurred in the last week of July but this was more than made up in the week ending Aug. 4. The *Journal of Commerce's* index, on the other hand, showed some loss from the month's high. On Aug. 5 it declined to 68.3 as compared with 68.6 a week earlier and the 1933 peak of 70.4, reached on July 15. Generally speaking prices for building materials, textiles, non-ferrous metals and pulp and paper advanced in the last week (ending Aug. 5), while those for fuel, paint materials, and grains declined.

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, June	9,299	8,309	4,247
–†Brokers Loans, July 26	$894	$967	$331
*Building Contracts, June	$103,255	$77,171	$113,075
–*Car Loadings, July 22	648	648	501
†Commercial Paper, June 30	$72	$60	$103
–†Elec. output., kwh., July 22	1,654	1,648	1,433
Payrolls, May	42.0	38.6	46.2
Failures, Dun, June	1,648	1,909	2,688
*Merchandise Imports, June	$122,000	$107,000	$110,280
*Merchandise Exports, June	$119,900	$114,000	$114,148
Furnaces in Blast, %, July 1	31.6	22.1	16.1
*Steel Orders, June 30	2,106	1,929	2,034

*000 omitted. †000,000. –Weeks, not months.



Because they are more nearly current than the monthly U. S. Dept. of Commerce charts the above indices by the N. Y. Times *have been substituted. Reading left to right, top, freight car loadings, automobile production, lumber production, electric power production, steel ingot production, cotton forwarding.*

N. Y. Times Index of business activity shows a slight decline in the period between June 24 (93.8) and July 29 (92.0). This is due, largely, however, to the sharp drop in cotton forwardings.

	Week Ended			
	July 29 1933	*July 22 1933*	*June 24 1933*	*July 30 1932*
Combined index	**92.0**	**95.8**	**93.8**	**63.9**
Without cotton fwdgs	85.9	86.1	81.6	..
Freight car loadings	63.7	66.0	62.7	51.0
Steel mill activity	83.6	84.2	72.6	22.0
Electric power output	97.4	97.1	94.8	84.4
Automobile production	78.5	70.0	57.2	29.1
Lumber production	68.1	71.2	60.7	35.0
Cotton forwardings	180.2	230.5	262.2	61.3

Industry in its upward march has been hampered somewhat by a small epidemic of strikes. These have in the main ended abruptly upon the forceful demand of stern uncompromising Gen. Hugh S. Johnson, N.R.A. head, that nothing be permitted to stand in the way of the fullest possible functioning of the N.R.A. Response to the latter, particularly after President Roosevelt's stirring radio appeal, has been perfectly amazing and business has already undoubtedly felt the movement in a real practical way. The job of organization is nevertheless enormous and the difficulties many. Universally the feeling pervades industry that prices generally are still to go higher, particularly the prices of manufactured items, as contrasted with raw materials. With higher wages and bigger payrolls it appears that the trend can only be upward.

Slight Slackening in Chemicals

Some slight slackening appeared in shipments of chemicals going into the consuming industries, but total volume was quite satisfactory, nevertheless, and the movement still continued to go against the usual downward seasonal trend. August, usually one of the poorest tonnage months, is expected to follow closely upon June and July.

Price advances in a number of important items were announced and these are detailed elsewhere. The entire price structure, heavy, fine, naval stores, gums, waxes, shellac, oils and fats, tanning materials, etc., shows net gains for the month. The one outstanding price reduction occurred in C. D. 5 alcohol. Following are the National Fertilizer Association indices:

Group	*Latest Week July 29 1933*	*Preceding Week*	*Month Ago*	*Year Ago*
Fuel	58.0	57.7	53.9	67.6
Grains, feeds and livestock	56.9	55.3	51.2	45.7
Textiles	67.1	66.5	61.3	40.3
Miscellaneous commd	68.0	67.0	62.9	59.6
Automobiles	84.4	84.4	84.4	87.7
Building materials	74.1	74.1	72.2	71.6
Metals	78.2	78.6	74.5	68.0
Fats and oils	54.0	55.9	54.5	40.5
Chemicals and drugs	87.0	86.6	87.9	87.4
Fertilizer materials	66.7	65.8	64.9	67.7
Mixed fertilizer	65.9	65.9	65.7	71.8
Agricultural implem.	90.1	90.1	90.1	92.1
All groups combined	67.5	67.3	63.8	61.5

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1932 Average $1.64 - Jan. 1932 $1.54 - July 1933 $1.45

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21	.18½	.21	.18½	.21
Acetaldol, 50 gal dr.........lb.	.27	.31	.27	.31	.27	.31
Acetamide.................lb.	.95	1.35	.95	.35	.95	1.35
Acetanilid, tech, 150 lb bbl...lb.	....	.26	...	.26	.20	.26
Acetic Anhydride, 92-95%, 100 lb cbys...............lb.	.21	.25	.21	.25	.21	.25
Acetin, tech drums..........lb.	.30	.32	.30	.32	.30	.32
Acetone, tanks..............lb.	.08	.08½	.08	.10	...	.10
Acetone Oil, bbls NY......gal..	1.15	1.25	1.15	1.25	1.15	1.25
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.55	.68
Acetylene Tetrachloride (see tetrachlorethane).............						
Acids						
Acid Abietic..................	....	.06	.06	.12	.12	.12
Acetic, 28% 400 lb bbls c-1 wks ....100 lb.	....	2.91	2.65	2.91	2.40	2.75
Glacial, bbl c-1 wk....100 lb.	....	10.02	9.14	10.02	8.35	9.14
Adipic........................	.72	.72	.72	.72	.72	.72
Anthranilic, refd, bbls........lb.	.85	.95	.85	.95	.85	.95
Technical, bbls...........lb.	.65	.70	.65	.70	.65	.70
Battery, cbys...........100 lb.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb bbls....lb.	.40	.45	.35	.45	.35	.45
Boric, powd, 250 lb. bbls. ....lb.	.0425	.05	.0425	.05	.0425	.07
Broenner's, bbls.. ....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 100% basis cbys....lb.	.80	.85	.80	.85	.80	.85
Camphoric.................lb.	....	5.25	...	5.25	.....	5.25
Chlorosulfonic, 1500 lb drums wks.................lb.	.04½	.05½	.04½	.05½	.04½	.05½
Chromic, 99½%, drs.........lb.	.11½	.12½	.11½	.12½	.11½	.14½
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.00	1.06
Citric, USP, crystals, 230 lb. bbls.................lb.	.29	.30	.29	.30	.29	.33½
Cleve's, 250 lb bbls.........lb.	.52	.54	.52	.54	.52	.54
Cresylic, 95%, dark drs NY.gal.	.42	.45	.38	.45	.40	.47
97-99%, pale drs NY.....gal.	....	.45	.40	.45	.42	.50
Formic, tech 90%, 140 lb. cby...................lb.	.10½	.12	.10½	.12	.10½	.12
Furoic, tech., 100 lb. drums.lb.	....	.35	...	.35	.....	.....
Gallic, tech, bbls............lb.	.60	.70	.60	.70	.60	.70
USP, bbls.................lb.	....	.74	...	.74	.....	.74
Gamma, 225 lb bbls wks.....lb	.77	.79	.75	.79	.75	.80
H, 225 lb bbls wks..........lb.	.65	.70	.60	.70	.60	.65
Hydriodic, USP, 10% soln cby lb.	.50	.51	.50	.51	.59	.67
Hydrobromic, 48%, coml, 155 lb cbys wks............lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, CP, see Acid Muriatic..................						
Hydrocyanic, cylinders wks .lb.	.80	.90	.80	.90	.80	.90
Hydrofluoric, 30%, 400 lb bbls wks...................lb.	....	.06	...	.06	.....	.06
Hydrofluosilicic, 35%, 400 lb. bbls wks...............lb.	.11	.12	.11	.12	.11	.12
Hypophosphorous, 30%, USP, demijohns ....lb.	.75	.80	.75	.80	.75	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.04	.04½
44%, light, 500 lb bbls.....lb.	.11½	.12	.11½	.12	.11½	.12
Laurent's, 250 lb bbls.... ...lb.	.36	.37	.36	.37	.36	.42
Linoleic...................lb.	.16	.16	.16	.16	.16	.16
Maleic, cry. kegs............lb.	....	.35	...	...	...	...
Malic, powd, kegs...........lb.	.45	.60	.45	.60	.45	.60
Metanilic, 250 lb bbls........lb	.60	.65	.60	.65	.60	.65
Mixed Sulfuric - Nitric......... tanks wks..........N unit	.06½	.07½	.06½	.07½	.07	.07½
tanks wks..........S unit	.008	.01	.008	.01	.008	.01
Monochloroacetic, tech bbl...lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls..........lb.	1.50	1.60	1.50	1.60	1.55	1.70
Muriatic, 18 deg, 120 lb cbys c-1 wks............100 lb.	....	1.35	...	1.35	.....	1.35
tanks, wks..........100 lb.	....	1.00	...	1.00	.....	1.00
20 degrees, cbys wks...100 lb.	....	1.45	...	1.45	.....	1.45
N & W, 250 lb bbls.............	.85	.95	.85	.95	.85	.95
Naphthionic, tech, 250 lb......	.60	.65	.60	.65	.60	.65
Nitric, 36 deg, 135 lb cbys c-wks. ....100 lb.	....	5.00	...	5.00	.....	5.00
40 deg, 135 lb cbys, c-1 wks................100 lb.	....	6.00	...	6.00	.....	6.00
Oxalic, 300 lb bbls wks NY....lb.	.11	.11½	.11	.11½	.11	.11½
Phosphoric 50%, U. S. P.....lb.	....	.14	...	.14	.....	.14
Syrupy, USP, 70 lb drs....lb.	....	.14	...	.14	.....	.14
Picramic, 300 lb bbls........lb.	.65	.70	.65	.70	.65	.70
Picric, kegs.................lb.	.30	.50	.30	.50	.30	.50
Pyrogallic, crystals............ ....lb.	1.40	1.45	1.40	1.45	1.45	1.60
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.33	.37
Sebacic, tech, drum..........lb.	.58	.58	.58	.58	.....	.....
Sulfanilic, 250 lb. bbls.......lb.	.15	.17	.15	.17	.14½	.16
Sulfuric, 66 deg, 180 lb cbys 1c-1 wks...........100 lb.	1.60	1.95	1.60	1.95	1.60	1.95
tanks, wks, ton	....	15.00	....	15.00	.....	15.00
1500 lb dr wks......100 lb.	1.50	1.65	1.50	1.65	1.50	1.65
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.27½	1.42½
Oleum, 20%, 1500 lb. drs 1c-1 wks...................ton	....	18.50	....	18.50	.....	18.50
40%, 1c-1 wks net........ton	....	42.00	....	42.00	.....	42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran. powd, 300 lb bbls..............lb.	....	.23	.20	.23	.20	.25½
Tobias, 250 lb bbls........lb.	.75	.80	.75	.80	.75	.85
Trichloroacetic bottles.....lb.	2.00	2.75	2.00	2.75	.....	2.75
Kegs..................lb.	...	1.75	....	1.75	.....	2.00
Tungstic, bbls..............lb.	1.40	1.70	1.40	1.70	1.40	1.70
Albumen, blood, 225 lb bbls...lb.	.35	.43	.35	.43	.35	.40
dark.............bbls., lb.	.10	.17	.10	.17	10	.20
Egg, edible ....lb.	.81	.83	.74	.83	.75	.90
Technical, 200 lb cases...lb.	.62	.66	.62	.66	.62	.66
Vegetable, edible..........lb.	.65	.70	.60	.70	.60	.65
Technical..............lb.	.50	.55	.50	.55	.50	.55
Alcohol						
Alcohol Butyl, Normal, 50 gal drs c-1 wks............lb.	....	.10½	....	.10½	.123	.1595
Drums, 1-c-1 wks.......lb	....	.11	....	.11	'128	.1645
Tank cars wks..........lb.	....	.09½	....	.09½	.113	.143
Secondary tank ....lb.	....	.076	....	....	.....	....
drums carlots ....lb.	....	.086	....	....	.....	....
Amyl (from pentane) Tanks wks ....lb.	....	.143	.143	.176	.176	.203
Capryl, tech, drums.......lb.	....	.85	....	.85	.....	.85
Diacetone, tanks..........lb.	.15¾	.16¾	.15¾	.16¾	.....	.....
Ethyl, USP, 190 pf, 50 gal. bbls‡...............gal.	2.41½	2.58½	2.41½	2.65	2.55	2.65
No. 5. *188 pf, 50 gal. drs. drums extra†........gal.	....	.351*	....	.385*	.27	.396
No. S. D. 1, tanks......gal.	....	.304	....	.304	.....	.....
Furfuryl, tech., 500 lb. drs.lb	....	.40	.40	.45	.....	.....
Isobutyl, ref., gal. drs.....gal.	....	.75	....	.75	.....	.75
Isopropyl, ref, gal drs.....gal.	....	.50	.45	.50	.45	.65
Propyl Normal, 50 gal dr..gal.	....	.75	....	.75	.....	.75
Aldehyde Ammonia, 100 gal drlb.	.80	.82	.80	.82	.80	.82
Alpha-Naphthol, crude, 300 lb. bbls..................lb.	.65	.70	.65	.70	.57	.65
Alpha-Naphthylamine, 350 lb. bbls..................lb.	.32	.34	.32	.34	.32	.34
Alum Ammonia, lump, 400 lb bbls, 1-c-1 wks......100 lb.	3.00	3.25	3.00	3.25	3.00	3.25
Chrome, 500 lb casks, wks ....100 lb.	4.50	5.25	4.50	5.25	4.50	5.25
Potash, lump, 400 lb casks wks...............100 lb.	3.00	3.50	3.00	3.50	3.00	3.50
Soda, ground, 400 lb bbls wks...............100 lb.	3.50	3.75	3.50	3.75	3.50	3.75
Aluminum Metal, c-1 NY.100 lb.	22.90	24.30	22.00	24.30	22.90	24.30
Chloride Anhydrous ......lb.	.04	.08	.04	.09	.05	.09
Hydrate, 96%, light, 90 lb. bbls..................lb.	.15	.16½	.15	.16½	.15	.17
Stearate, 100 lb bbls.......lb.	.13½	.17	.12½	.17	.15	.21
Sulfate, Iron, free, bags c-1 wks.............100 lb.	1.90	1.95	1.90	1.95	1.90	1.95
Coml, bags c-1 wks .100 lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminoazobenzene, 110 lb kegs lb.	....	1.15	....	1.15	.....	1.15
Ammonia						
Ammonia anhydrous Com. tanks	....	.05	....	.05	.05	.05½
Ammonia, anhyd. 100 lb cyl...lb.	.15½	.15½	.15½	.15½	.15½	.15½
Water, 26°, 800 lb dr del...lb.	.02½	.03	.02½	.03	.02½	.03
Ammonia, aqua 26° tanks.... NH cont.................	....	.05	.....	.05	.....	.....
Ammonium Acetate ....lb.	.26	.33	.26	.33	.26	.39
Bicarbonate, bbls., f.o.b. plant ....100 lb.	....	5.15	....	5.15	.....	5.15
Bifluoride, 300 lb bbls.....lb.	.14½	.17	.14½	.17	.14½	.22
Carbonate, tech, 500 lb cs..lb.	.08	.12	.08	.12	.08	.12
Chloride, white, 100 lb. bbls wks ....100 lb.	4.45	4.90	4.45	4.90	4.45	5.15
Gray, 250 lb bbls wks...lb.	5.25	5.75	5.25	5.75	5.25	5.75
Lump, 500 lb cks spot...lb.	.10	.11	.10	.11	.10½	.11½
Lactate, 500 lb bbls.......lb.	.15	.16	.15	.16	.15	.16
Linoleate.................lb.	....	.11	....	.11	.11	.15
Nitrate, tech, casks........lb.	.06	.10	.06	.10	.06	.10
Oleate, drs................lb.	....	.10	....	.10	.....	.10
Persulfate, 112 lb kegs.....lb.	.20	.22½	.20	.22½	.20	.27½
Phosphate, tech, powd, 325 lb. bbls.................lb.	.08½	.11½	.08½	.11½	.08½	.12
Sulfate, bulk c-1.......100 lb.	....	1.20	1.00	1.20	.90	1.40
Sulfocyanide, kegs........lb.	.36	.48	.36	.48	.36	.48
Amyl Acetate, (from pentane) Tanks del.............lb.	....	.13½	...	.13½	.157	.17½

†Anhydrous 5c higher. ‡From grain 5c higher.
*Delivered metropolitan area basic price 34c.

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Tech., drs del. . . . . .lb.	.142	.149	.138	.149	.17½	.18
Amyl Alcohol, see Fusel Oil.						
Aniline Oil, 960 lb drs & tks. .lb.	.14½	.16	.14½	.16	.14½	.16
Annatto, fine. . . . . .lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% . . . . .lb.	. . . .	.75	. . . .	. . . .	. . . . .	. . . . .
40% . . . . .lb.	. . . .	.18	. . . .	. . . .	. . . . .	. . . . .
Anthraquinone, sublimed, 125 lb. bbls. . . . . .lb.	. . . .	.45	. . .	.45	.45	.55
Antimony, metal slabs, ton lots . . . . .lb.	. . . .	.07¼	.05⅜	.07½	.05	.06½
Needle, powd, bbls. . . . . . . .lb.	.08	.09	.07	.09	.08½	.09
Chloride, soln (butter of) cbys. . . . . .lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls. . . . . .lb.	.08½	.11	.07½	.11	.07½	.08¾
Salt, 63% to 65%, tins. . . .lb.	.22	.24	.20	.24	.20	.24
Sulfuret, golden, bbls . . . . .lb.	.16	.20	.16	.20	.16	.20
Vermillion, bbls. . . . . .lb.	.38	.42	.38	.42	.38	.42
Archil, conc, 600 lb bbls. . . . .lb.	.20	.21	.20	.21	.17	.21
Double, 600 lb bbls. . . . . . . .lb.	.16	.17	.16	.17	.16	.17
Triple, 600 lb bbls. . . . . . . .lb.	.16	.17	.16	.17	.16	.17
Argols, 80%, casks. . . . . .lb.	.14	.15	.12	.15	.12½	.13
Crude, 30%, casks. . . . . . . .lb.	.08	.09	.06¾	.09	.07	.07½
Aroclors, wks. . . . . .lb.	.18	.30	.18	.30	.18	.40
Arrowroot, bbl. . . . . .lb.	.08¼	.08¾	. . . .	. . . .	. . . . .	. . . . .
Arsenic, Red. 224 lb kegs, cs. .lb.	.13	.13¾	.09⅞	.13¾	.09⅞	.10
White, 112 lb kegs. . . . . .lb.	.04	.05	.04	.05	.04	.05
Asbestine, c-1 wks. . . . . .ton	13.00	15.00	13.00	15.00	. . . . .	15.00

Barium

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Barium Carbonate, precip, 200 lb. bags wks. . . . . .ton	56.50	58.50	56.50	58.50	47.00	57.00
Nat. (witherite) 90% gr. car-lots wks bags. . . . . .ton	. . . . .	40.00	. . . . .	. . . . .	. . . . .	. . . . .
Chlorate, 112 lb kegs NY. .lb.	.15	.16	.13¾	.16	.13¾	.15
Chloride, 600 lb bbl wks. . .ton	61.50	65.00	61.50	69.00	63.00	69.00
Dioxide, 88%, 690 lb drs. . .lb.	.11	.13	.11	.13	.11	.13
Hydrate, 500 lb bbls. . . . . . .lb.	.04¾	.05	.04½	.05	.04¾	.05½
Nitrate, 700 lb casks. . . . . .lb.	. . . . .	.07½	. . .	.07½	.07	.08
Barytes, Floated, 350 lb bbls wks. . . . . .ton	22.20	30.50	22.20	30.50	22.00	24.00
Bauxite, bulk, mines. . . . . . . .ton	5.00	6.00	5.00	6.00	5.00	6.00
Bayberry, bags . . . . .lb.	.16	.17	.14½	.17	. . . . .	. . . . .
Beeswax, Yellow, crude bags. .lb.	.19	.20	.13	.20	.14½	.24
Refined, cases. . . . . .lb.	.22	.26	.18	.26	.20	.28
White, cases. . . . . .lb.	.32	.35	.30	.35	.30	.36
Benzaldehyde, technical, 945 lb. drums wks . . . . .lb.	.60	.65	.60	.65	.60	.65
Benzene, 90%, Industrial, 8000 gal tanks wks. . . . . .gal.	. . . . .	.22	.20	.22	. . . . .	.20
Ind. Pure, tanks works. . . .gal.	. . . . .	.22	.20	.22	. . . . .	.20
Benzidine Base, dry, 250 lb. bbls. . . . . .lb.	.65	.67	.65	.67	.65	.67
Benzoyl, Chloride, 500 lb drs.lb.	.40	.45	.40	.45	.40	.47
Benzyl Chloride, tech drs. . . .lb.	. . . . .	.30	. . .	.30	. . . . .	.30
Beta-Naphthol, 250 lb bbl wk .lb.	. . . . .	.22	. . .	.22	. . . . .	.22
Naphthylamine, sublimed, 200 lb bbls. . . . . .lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls . . . . .lb.	.53	.58	.53	.58	.53	.58
Bismuth, metal	. . . .	1.05	.85	1.05	. . . . .	. . . . .
Bismuth Subnitrate	. . . .	1.25	.95	1.25	. . . . .	. . . . .
Blackstrap, cane, tanks, f. o. b. N. Y. . . . . .gal.	.04½	.05	. . . .	. . . .	. . . . .	. . . . .
Blanc Fixe, 400 lb bbls wks. .ton	42.50‡	65.00	42.50	75.00	. . . . .	. . . . .
Bleaching Powder, 800 lb drs c-1 wks contract. . . .100 lb.	1.75	2.00	1.75	2.00	1.75	2.00
Blood, Dried, fob, NY. . . . .Unit	2.60	2.70	1.55	2.70	1.20	1.90
Chicago, high grade. . . . .Unit	. . . . .	2.50	. . . .	. . . .	. . . . .	. . . . .
S. American shipt. . . . . . .Unit	2.85	3.00	1.90	3.00	2.00	2.25
Blues, Bronze Chinese Milori Prussian Soluble. . . . . . . .lb.	. . . . .	.35	. . .	.35	. . . . .	.35
Bone, raw, Chicago. . . . . .ton	26.00	28.00	19.00	28.00	20.00	22.00
Bone Ash, 100 lb kegs. . . . . . .lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls. . . . . .lb.	.05½	.08½	.05½	.08¼	.05½	.08¼
Meal, 3% & 50%, Imp. . . .ton	. . . . .	23.50	18.00	25.00	20.00	23.00
Borax, bags. . . . . .lb.	.018	.02	.018	.02	.018	.03½
Bordeaux, Mixture, 16% pwd.lb.	.08½	.10½	.11½	.10½	.11½	.13
Paste, bbls. . . . . .lb.	.08½	.13	.10½	.13	.11½	.13
Brazilwood, sticks, shpmt. . . . .lb.	26.00	28.00	26.00	28.00	26.00	28.00
Bromine, cases. . . . . .lb.	.36	.43	.36	.43	.36	.43
Bronze, Aluminum, powd blk. .lb.	.50	.75	.50	.75	.60	1.20
Gold bulk. . . . . .lb.	.40	.55	.40	.55	.55	1.25
Butanes, com 16.32° group 3 tanks . . . . .lb.	. . . . .	.04	.02¾	.04	. . . . .	. . . . .
Butyl, Acetate, normal drs. . .lb.	. . . . .	.11	.11	.139	.134	.166
Tank, wks. . . . . .lb.	. . . . .	.10	.10	.124	.124	.143
Secondary tanks, wks. . . . . .lb.	. . . .	.08	. . . .	. . . .	. . . . .	. . . . .
Aldehyde, 50 gal drs wks. . .lb.	.31½	.36	.31½	.36	.31½	.36
Carbitol see Diethylene Glycol Mono (Butyl Ether)		. . . . .	. . . .	. . . .	. . . . .	. . . . .
Cellosolve (see Ethylene glycol mono butyl ether).						
Furoate, tech., 50 gal. dr. . .lb.	. . . . .	.60	.50	.60	. . . . .	.50
Lactate, drums . . . . .lb.	. . . .	.29	. . . .	. . . .	. . . . .	. . . . .
Propionate, drs. . . . . .lb.	.20	.22	.20	.22	.20	.25
Stearate, 50 gal drs. . . . . . . .lb.	.25	.25½	.25	.25½	.25	.25½
Tartrate, drs . . . . .lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes. . . . .lb.	.65	.75	.65	.75	.65	.90
Calcium, Acetate, 150 lb bags c-1. . . . . .100 lb.	. . . . .	3.00	2.50	3.00	2.00	2.50
Arsenate, 100 lb bbls c-1 wks .lb.	. . . . .	.07	.05½	.07	.05½	.06
Carbide, drs. . . . . .lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bags c-1. . . . . .lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks. . . . . .ton	. . . . .	19.50	19.50	21.00	. . . . .	21.00
Solid, 650 lb drs c-1 fob wks . . . . .ton	. . . . .	17.50	17.50	18.00	. . . . .	18.00

†F. O. B. destination, 1931 prices are works prices.
‡Lowest price is for pulp; highest for high-grade precipitate.

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Calcium Furoate, tech, 100 lb. drums........lb.	.....	.30	....	.30	.....	.30
Nitrate, 100 lb bags........ton	24.50	26.00	24.00	26.00	34.00	35.00
Palmitate, bbls..........lb.	.17	.19	.16	.19	.....	.....
Peroxide, 100 lb drs........lb.	.....	1.25	....	1.25	.....	1.25
Phosphate, tech, 450 lb bbls.lb.	.07½	.08	.07½	.08	.07½	.08¾
Resinate, precip., bbls.....lb.	.13	.14	....	....	.....	.....
Stearate, 100 lb. bbls......lb.	.16	.17	.12½	.17	.16	.18
Camphor, slabs..............lb.	.....	.52	.35½	.52	.....	.....
Powder..................lb.	.....	.52	.38	.52	.....	.....
Camwood, Bark, ground bbls.lb.	.16	.18	.16	.18	.16	.18
Candelilla Wax, bags........lb.	.09½	.10	.09	.11	.10	.14
Carbitol, (See Diethylene Glycol Mono Ethyl Ether)............		.....	....	...	.....	.....
Carbon, Decolorizing, drums c-1..................lb.	.08	.15	.08	.15	.08	.15
Black, 100-300 lb cases 1c-1 NY..................lb.	.06	.12	.06	.12	.06	.12
Bisulfide, 500 lb drs 1c-1 NY..................lb.	.05½	.06	.05½	.06	.05½	.06
Dioxide, Liq. 20-25 lb cyl..lb...	..	.06	....	.06	.....	.06
Tetrachloride, 1400 lb drs delivered. ....lb.	.05¼	.06	.05¼	.07	.06¼	.07
Carnauba Wax, Flor, bags...lb.	.....	.32	.23	.31	.23	.28
No. 1 Yellow, bags ....lb.	.29	.30	.20	.30	.21	.24
Nc. 2 N Country, bags....lb.	.17½	.18	.14	.18	.13	.16
No. 2 Regular, bags.......lb.	.28	.29	.20	.29	.20	.24
No. 3 N. C..............lb.	.13½	.14	.11½	.16	.11	.13
No. 3 Chalky ....lb.	.13½	.14	.12	.14	.11	.13
Casein, Standard, Domestic.... ground..................lb.	.....	.15	.06½	.15	.04¾	.07½
80-100 mesh carlots, bags..lb.	.....	.16	....	....	.....	.....
Cellosolve (see Ethylene glycol mono ethyl ether)..........						
Acetate (see Ethylene glycol mono ethyl ether acetate)..						
Celluloid, Scraps, Ivory cs....lb.	.13	.14	.13	.15	.13	.15
Shell, cases..............lb.	.18	.20	.18	.20	.18	.20
Transparent, cases........lb.	.....	.16	....	.16	.....	.15
Cellulose, Acetate, 50 lb kegs.lb.	.80	.90	.80	.90	.80	.90
Chalk, dropped, 175 lb bbls..lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks...lb.	.02	.03½	.02	.03½	.02	.03½
Light, 250 lb casks........lb.	.02½	.03½	.02½	.03½	.02¼	.03½
Charcoal, Hardwood, lump, bulk wks..................bu.	.18	.19	.18	.19	.18	.19
Willow, powd, 100 lb bbl. wks..................lb.	.06	.06½	.06	.06¼	.06	.06½
Wood, powd, 100 lb bbls...lb.	.04	.05	.04	.05	.04	.05
Chestnut, clarified bbls wks...lb.	.01⅝	.02	.01⅝	.02	.01⅝	.02
25% tks wks............lb.	.....	.01½	.012	.01½	.01¾	.02½
Powd, 60%, 100 lb bgs wks.lb.	.....	.04¾	....	.04¾	.....	.04¾
Powd, decolorized bgs wks..lb.	.04⅞	.05	.04⅞	.05	.04⅞	.06
China Clay, lump, blk mines..ton	8.00	9.00	8.00	9.00	8.00	9.00
Powdered, bbls...........lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls wks......ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, bulk.....ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine, cyls 1c-1 wks contract ....lb.	.07	.08½	.07	.08½	.07	.08½
cyls, cl., contract........lb.	.....	.05½†	....	.05½	....	.05½
Liq tank or multi-car lot cyls wks contract........100 lb.	.....	1.75	....	1.75	1.55	1.75
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks...........lb.	.06	.07½	.06	.07½	.06	.10½
Chloroform, tech, 1000 lb drs..lb.	.....	.20	.15	.20	.15	.16
USP, tins...............lb.	.....	.30	....	....	.....	.....
Chloropicrin, comml cyls.....lb.	.90	1.25	.90	1.35	1.00	1.35
Chrome, Green, CP.........lb.	.23	.29	.23	.29	.23	.29
Commercial..............lb.	.06½	.10	.06¼	.10	.06¼	.11
Yellow..................lb.	.14	.15	.14	.15	.14	.18
Chromium, Acetate, 8% Chrome bbls..................lb.	.05	.05¾	.04¾	.05¾	.04¾	.05¾
20° soln, 400 lb bbls......lb.	.....	.05½	....	.05½	.....	.05½
Fluoride, powd, 400 lb bbl..lb.	.27	.28	.27	.28	.27	.28
Oxide, green, bbls.........lb.	.28	.33	.28	.33	.28	.35½
Coal tar, bbls..............bbl.	8.50	9.00	.50	9.00	10.00	10.50
Cobalt Acetate, bbls........lb.	.75	.80	....	....	.....	.....
Carbonate tech., bbls......lb.	1.34	1.40	....	....	.....	.....
Hydrate, bbls...........lb.	1.66	1.76	....	....	.....	.....
Linoleate, paste, bbls......lb.	.39	.40	....	....	.....	.....
Resinate, fused, bbls.......lb.	.....	.12½	....	....	.....	.....
Precipitated, bbls.......lb.	.41	.42	.41	.42	.....	.....
Cobalt Oxide. black. bags....lb.	1.15	1.25	1.15	1.25	1.15	1.45
Cochineal, gray or black bag..lb.	.36	.42	.36	.42	.38	.57
Teneriffe silver, bags......lb.	.37	.43	.37	.43	.39	.57
Copper, metal, electrol...100 lb.	.....	9.00	5.00	9.00	5.05	7.25
Carbonate, 400 lb bbls.....lb.	.07	.15½	.07	.15½	.07	.16½
Chloride, 250 lb bbls......lb.	.17	.18	.17	.18	.17	.25
Cyanide, 100 lb drs........lb.	.39	.40	.39	.40	.39	.40
Oleate, precip., bbls.......lb.	.....	.20	....	....	.....	.....
Oxide, red, 100 lb bbls.....lb.	.14¾	.15	.14¾	.15	.15	.16
Resinate, precip., bbls.....lb.	.18	.19	....	....	.....	.....
Stearate, precip., bbls.....lb.	.35	.40	....	....	.....	.....
Sub-acetate verdigris, 400 lb bbls..................lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls c-1 wks....100 lb.	.....	3.75	3.00	3.75	2.75	3.10
Copperas, crys and sugar bulk c-1 wks bags..........ton	14.00	14.50	14.00	14.50	14.00	14.50
Corn Syrup, 42 deg., bbls.100 lb.	.....	2.88	2.61	2.88	.....	.....
43 deg., bbls..........100 lb.	.....	2.93	2.66	2.93	.....	.....
Cotton, Soluble, wet, 100 lb bbls..................lb.	.40	.42	.40	.42	.40	.42
Cottonseed, S. E. bulk c-1...ton	.....	26.50	....	26.50	.....	26.50
Meal S. E. bulk..........ton		.....	....	....	.....	.....
7% Amm., bags mills...ton	13.25	38.00	13.25	38.00	13.25	38.00
Cream Tartar, USP, 300 lb. bbls..................lb.	.....	.16½	.14½	.16½	.15½	.20¼
Creosote, USP, 42 lb cbys.....lb.	.45	.47	.40	.47	.40	.42
Oil, Grade 1 tanks........gal.	.11	.12	.11	.12	11	12½
Grade 2...............gal.	.10	.12	.10	.12	.10	.11½
Grade 3...............gal.	.09	.12	.09	.12	.09	.11½
Cresol, USP, drums.........lb.	.10½	.11	.10½	.11	.10½	.11

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Crotonaldehyde, 50 gal dr....lb.	.32	.36	.32	.36	.32	.36
Cudbear, English............lb.	.19	.25	.16	.25	.16	.17
Cutch, Rangoon, 100 lb bales.lb.	.....	.02¾	.02½	.03	.08¼	.12
Borneo, Solid, 100 lb bale...lb.	.....	.04½	.02½	.04½	.03	.07
Cyanamide, bags c-1 frt allowed						
Ammonia unit..................		1.02½	.97½	1.02½		.97½
Dextrin, corn, 140 lb bags.100 lb.	3.64	3.84	2.89	3.84	2.99	3.67
British Gum, bags .....100 lb.	3.89	....	3.89	....	.....	.....
White, 140 lb bags.....100 lb	3.59	3.79	2.94	3.79	2.94	3.37
Potato Yellow, 220 lb bgs..lb.	.07¾	.08¾	.07¾	.09	.08	.09
White, 220 lb bags 1c-1....lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 lb bags 1c-1...lb.	.06¾	.07¾	.06¾	.08	.07	.08¾
Diamylether, wks., drums....lb.	.....	.60	....	....	.....	.....
Diamylphthalate, drs wks...gal.	.....	.20½	....	....	.....	.....
Dianisidine, barrels..........lb.	2.35	2.70	2.35	2.70	2.35	2.70
Dibutylphthalate, wks........lb.	.20½	.21	.20½	.22	.218	.23½
Dibutyltartrate, 50 gal drs...lb.	.29½	.31½	.29½	.21	.29½	.31½
Dichloroethylether, 50 gal drs lb.	.....	.16	....	.16	.....	.16
Dichloromethane, drs wks....lb.	.55	.65	.55	.65	.55	.65
Diethylamine, 400 lb drs.....lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylcarbonate, com. drs..gal.	.....	.31¾	....	....	.....	.....
Diethylaniline, 850 lb drs....lb.	.52	.55	.52	.55	.55	.60
Diethyleneglycol, drs........lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ether, drs...lb.	.15	.16	.15	.16	.15	.16
Mono butyl ether, drs...lb.	.....	.26	....	.26	.24	.30
Diethylene oxide, 50 gal drs..lb.	.26	.27	.26	.27	.....	.....
Diethylorthotoluidin, drs.....lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb.						
drums.................lb.	.....	.20	.20	.26	.23	.26
Diethylsulfate, technical, 50 gal						
drums.................lb.	...	...	....	....	.30	.35
Digtycol Oleate, bbls........lb.	.....	.16	....	....	.....	.....
Dimethylamine, 400 lb drs, pure						
25 & 40% sol. 100% basis.lb.	.....	1.20	....	....	.....	....
Dimethylaniline, 340 lb drs...lb.	.26	.28	.25	.28	.25	.27
Dimethyl phthalate drs......lb.	.....	.24½	....	....	.....	.....
Dimethylsulfate, 100 lb drs...lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls...lb.	.....	.18	....	.18	.15	.16
Dintrochlorobenzene, 400 lb						
bbls..................lb.	.13	.15	.13	.15	.13	.15
Dinitronaphthalene, 350 lb bbls						
.........................lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls....lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls....lb.	.15	.16	.15	.17	.16	.17
Dioxan (See Diethylene Oxide).......		.....	....	....	.....	.....
Diphenyl...................lb.	.15	.25	.15	.40	.20	.40
Diphenylamine..............lb.	.31	.34	.31	.34	.34	.37
Diphenylguanidine, 100 lb bbl lb.	.30	.35	.30	.35	.30	.35
Dip Oil, 25%, drums........lb.	.23	.25	.23	.25	.26	.30
Divi Divi pods, bgs shipmt..ton	30.00	32.00	26.00	32.00	26.00	30.00
Extract...................lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb cases ......lb.	.....	.43	.40	.43	.40	.52
Epsom Salt, tech, 300 lb bbls						
c-1 NY ... .100 lb.	.....	2.20	....	2.20	1.70	1.90
Ether, USP anaesthesia 55 lb. drs.						
.. ..lb.	.22	.23	.22	.23	.22	.23
(Conc)...................lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal. drums ...lb.	.07‡	.08	.07	.08	.....	.....
Synthetic, wks, drums.....lb.	.08	.09	....	....	.....	.....
Ethyl Acetate, 85% Ester						
tanks..................lb.	.07½	.08	.07½	.09	.08½	.09
drums..................lb.	.08½	.09	.08½	.10	.09½	.10
Anhydrous, tanks.........lb.	.09	.10	.09	.10	.....	.10
drums..................lb.	.10	.10¼	.10	.10¼	.....	.10½
Acetoacetate, 50 gal drs....lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs...lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drums......lb.	.50	.55	.50	.55	.50	.55
Carbonate, 90%, 50 gal drs gal.	1.85	1.90	1.85	1.90	1.85	1.90
Chloride, 200 lb drums.....lb.	.....	.22	....	.22	.....	.22
Chlorocarbonate, cbys.....lb.	.....	.30	....	.30	.....	.30
Ether, Absolute, 50 gal drs.lb.	.50	.52	.50	.52	.50	.52
Furoate, 1 lb tins.........lb.	.....	1.00	1.00	5.00	.....	5.00
Lactate, drums works .. .lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs..lb.	.....	.12½	....	.12½	.....	.30
Oxalate, drums works......lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks lb.	.30	.30½	.30	.30½	.....	.30½
Ethylene Dibromide, 60 lb dr..lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys.						
chloro, cont.............lb.	.75	.85	.75	.85	.7	.85
Dichloride, 50 gal drums....lb.	.05	.09	.05	.09	.0595	.07
Glycol, 50 gal drs wks.....lb.	.25	.28	.25	.28	.25	.28
Mono Butyl Ether drs wks......		.20	....	.20	.20	.24
Mono Ethyl Ether drs wks	.15	.17	.15	.17	.15	.20
Mono Ethyl Ether Acetate						
dr. wks..................	.16½	.18	.16½	.18	.16½	.23
Mono Methyl Ether, drs..lb.	.21	.23	.21	.23	.21	.23
Stearate..................	.18	.18	.18	.18	.18	.18
Oxide, cyl................lb.	.....	.75	....	.75	.75	2.00
Ethylidenaniline............lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, bulk pottery .....ton	15.50	16.50	14.00	16.50	15.00	20.00
Powdered, bulk works....ton	13.50	14.50	13.50	14.50	15.00	21.00
Ferric Chloride, tech, crystal						
475 lb bbls.............lb.	.05	.07½	.04½	.07½	.04½	.07½
Fish Scrap, dried, wks......unit	.....	2.60*	1.85	2.70*	1.60	3.00
Acid, Bulk 7 & 3½% delivered						
Norfolk & Balt. basis...unit	.....	2.50†	1.85	2.50†	1.40	2.40
Fluorspar, 98%, bags..........	28.00	35.50	28.00	35.50	28.00	46.00

*& 10; †& 50

Formaldehyde

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Formaldehyde, aniline, 100 lb.	.....	.....	....	....	.....	.....
drums..................lb.	.37½	.42	.37½	.42	.37½	.42
USP, 400 lb bbls wks......lb.	.06	.07	.06	.07	.06	.07¾
Fossil Flour................lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, bulk, mines...ton	15.00	20.00	15.00	20.00	15.00	20.00
Imp. powd c-1 bags.......ton	24.00	30.00	24.00	30.00	24.00	30.00
Furfural (tech.) drums wks,. .lb.	.10§	.15	.10	.15	.....	.10
Furfuramide (tech) 100 lb dr..lb.	.....	.30	....	.30	.....	.30
Furfuryl Acetate, 1 lb tins....lb.	.....	5.00	....	5.00	.....	5.00
Fusel Oil, 10% impurities....lb.	.16	.18	.14½	.18	.....	.....

‡Higher price, refined. §Tanks, 1c lower

Current

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Fustic, chips....lb.	.04	.05	.04	.05	.04	.05
Crystals, 100 lb boxes....lb.	.18	.20	.18	.20	.18	.20
Liquid 50°, 600 lb bbls....lb.	.....	.08	.07	.08	.07	.08
Solid, 50 lb boxes....lb.	.14	.16	.14	.16	.14	.16
Sticks....ton	25.00	26.00	25.00	26.00	25.00	26.00
G Salt paste, 360 lb bbls....lb.	.42	.43	.42	.43	.42	.50
Gall Extract....lb.	.18	.20	.18	.20	.18	.20
Gambier, common 200 lb cs..lb.	.03¾	.06¾	.03	.07	.06½	.07
Singapore cubes, 150 lb bg..lb.	.05¾	.06¾	.05¼	.08	.07¾	.09
Gelatin, tech, 100 lb cases....lb.	.45	.50	.45	.50	.45	.50
Glauber's Salt, tech, c-l wks. ....100 lb.	1.00	1.70	1.00	1.70	1.00	1.70
Glucose (grape sugar) dry 70-80° bags c-l NY....100 lb.	3.24	3.34	3.24	3.34	3.24	3.34
Tanner's Special, 100 lb bags ....100 lb.	.....	2.33	....	2.33	2.36	2.75
Glue, medium white, bbls....lb.	.15½	.20	.12	.20	.15½	.20
Pure white, bbls....lb.	.20	.26	.18	.26	.18	.27
Glycerin, CP, 550 lb drs....lb.	.....	.10¼	....	.10¼	.09¾	.11½
Dynamite, 100 lb drs....lb.	.....	.09	.07½	.09	.07½	.09¾
Saponification, tanks....lb.	.05½	.06	.05	.06	.04½	.06½
Soap Lye, tanks....lb.	.05	.05½	.04	.05½	.03¾	.05
Glyceryl Stearate, bbls....lb.	.....	.18	.17	.18	.....	.17
Graphite, crude, 220 lb bgs..ton	12.00	23.00	12.00	23.00	12.00	35.00
Flake, 500 lb bbls....lb.	.05	.06	.05	.06	.05	.09

Gums

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Gum Accroides, Red, coarse and fine 140-150 lb bags....lb.	.03¾	.04½	.03¾	.04½	.03¾	.04½
Powd, 150 lb bags....lb.	.06	.06½	.06	.06½	.06	.06½
Yellow. 150-200 lb bags....lb.	.18	.20	.18	.20	.18	.20
Aloes, Barbadoes....lb.	.85	.90	.85	.90	.....	.....
Animi (Zanzibar) bean & pea 250 lb cases....lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases....lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts....lb.	.07½	.07¾	.05¾	.08	.....	.....
Asphaltum, Barbadoes (Manjak) 200 lb bags....lb.	.03	.06	.03	.05	.04	.06
Egyptian, 200 lb cases....lb.	.13	.15	.13	.15	.13	.15
Gamboge, pipe, cases....lb.	.52	.55	.42	.55	.....	.....
Powdered, bbls....lb.	.60	.65	.50	.65	.....	.....
Gilsonite Selects, 200 lb bags ....ton	30.50	32.90	30.50	32.90	30.50	32.90
Damar Batavia standard 136, lb. cases....lb.	.15	.15½	.08½	.15½	.08½	.09
Batavia Dust, 160 lb bags....lb.	.07	.07½	.04	.07½	.04	.05½
E Seeds, 136 lb cases....lb.	.09	.09½	.05½	.09½	.05½	.06½
F Splinters, 136 lb cases and bags....lb.	.05½	.06	.05½	.06	.05½	.06
Singapore, No. 1, 224 lb cases .lb.	.17	.17½	.09½	.17½	.10½	11
No. 2, 224 lb cases....lb.	.11	.11½	.07	.11½	.06	.07½
No. 3, 180 lb bags....lb.	.06	.06½	.04½	.06½	.04½	.05
Benzoin Sumatra, U. S. P. 120 lb. cases....lb.	.20	.23	.17	.23	.18	.22
Copal Congo, 112 lb bags, clean opaque....lb.	.24	.24½	.16½	.24½	.16½	.17
Dark, amber....lb.	.08	.09	.06	.09	.06	.07
Light, amber....lb.	.12	.17	.08	.17	.08	.09
Water, white....lb.	.40	.45	.37	.45	.37	.45
Kino, tins....lb.	.75	.80	....	....	.....	.....
Mastic....lb.	.30	.34½	.26⅞	.34½	.26⅞	.40
Manila 180-190 lb baskets						
Loba A....lb.	.10½	.11½	.09	.11½	.09	.11
Loba B....lb.	.10	.11	.08	.11	.08	.08½
Loba C....lb.	.10½	.11	.07	.11	.07	.08
M A Sorts....lb.	.06	.06½	.05	.06½	.04¾	.05
D B B Chips....lb.	.07¾	.08¼	.05¼	.08¼	.05	.06½
East Indies chips, 180 lb bags lb.	.04	.05	.04	.05	.04½	.05½
Pale bold, 224 lb cs....lb.	.14	.15	.05½	.15	.06	.08
Pale nubs, 180 lb bags...lb.	.09	.11	.05	.11	.03½	.05
Pontianak, 224 lb cases....						
Bold gen No. 1....lb.	.17	.18	.14	.18	.14	.16
Gen. chips spot....lb.	.06	.06½	.05	.07	.05	.08
Elemi, No. 1, 80-85 lb cs....lb.	.10	.11	.09	.11	.09	.09½
No. 2, 80-85 lb cases....lb.	.09½	.10½	.08½	.10½	.08½	.09
No. 3, 80-85 lb cases....lb.	.08	.08½	.08	.08½	.08	.08½
Ghatti, sol. bags....lb.	.08½	.09½	.06	.09½	.....	.....
Karaya, pow. bbls xxx....lb.	.23	.25	....	....	.....	.....
xx....lb.	.16	.17	....	....	.....	.....
No. 1....lb.	.09	.12	....	....	.....	.....
No. 2....lb.	.08	.09	....	....	.....	.....
Kauri, 224-226 lb cases No. 1 .lb.	.20	.25	.20	.25	.20	.42
No. 2 fair pale....lb.	.12½	.16	.12½	.16	.12½	.30
Brown Chips, 224-226 lb. cases....lb.	.06½	.08½	.06½	.12	.10	.12
Bush Chips, 224-226 lb. cases....lb.	.22	.24	.22	.24	.22	.24
Pale Chips, 224-226 lb cases ....lb.	.11	.14	.11	.14	.11	.14
Sandarac, prime quality, 200 lb. bags & 300 lb. casks....lb.	.....	.26½	.21	.26½	.23	.25½
Senegal, picked bags....lb.	.15	.16	....	....	.....	.....
Thus, bbls....280 lbs.	.....	8.25	....	....	.....	.....
Strained....280 lbs.	.....	8.25	....	....	.....	.....
Tragacanth, No. 1 bags....lb.	.....	.90	.65	.90	.....	.....
Yacca, bags....lb.	.03½	.03¾	....	....	.....	.....

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Helium, 1 lit. bot....lit.	.....	25.00	....	25.00	.....	25.00
Hematine crystals, 400 lb bbls lb.	.14	.18	.10	.18	.10	.18
Paste, 500 bbls....lb.	.....	.11	....	.11	.....	.11
Hemlock 25%, 600 lb bbls wks lb.	.03½	.04½	.03½	.04½	.03	.04½
Bark....ton	.....	16.00	....	16.00	.....	16.00
Hexalene, 50 gal drs wks....lb.	.....	.30	....	.30	.30	.40
Hexane, normal 60-70° C. Group 3, tanks....gal.	.....	.11	....	....	.....	.....
Hexamethylenetetramine, drs lb.	.46	.47	.46	.47	.46	.47
Hoof Meal, f.o.b. Chicago...unit	1.40	1.75	.75	1.75	.75	1.35
South Amer. to arrive....unit	1.40	1.50	1.40	1.50	1.25	1.65
Hydrogen Peroxide, 100 vol, 140 lb cbys....lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride lb.	.....	3.15	....	3.15	.....	3.15

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Hypernic, 51°, 600 lb bbls....lb.	.11	.12	.11	.12	.11	.12
Indigo Madras, bbls.........lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drums.........lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid..........lb.	.....	.12	....	.12	.....	.12
Iodine, crude..........per kilo	.....	£1 5s	....	....	.....	.....
Resublimed, kegs..........lb.	3.35	3.40	2.65	3.40	.....	.....
Irish Moss, ord. bales........lb.	.06	.07	....	....	.....	.....
Bleached, prime, bales......lb.	.08½	.12	....	....	.....	.....
Iron Chloride see Ferric or Ferrous						
ron Nitrate, kegs...........lb.	.09	.10	.09	.10	.09	10
Coml, bbls..........100 lb.	2.75	3.25	2.50	3.25	2.50	3.25
Oxide, English..........lb.	.04½	.07	.04	.07	.04	.10
Japan Wax, 224 lb cases.....lb.	.07½	.08	.05½	.08	.06	.09
Kieselguhr, 95 lb bgs NY....... Brown...............ton	60.00	70.00	60.00	70.00	60.00	70 00
Lead Acetate, bbls wks...100 lb.	.....	9.50	8.50	9.50	9.00	10.00
White crystals, 500 lb bbls wks...............100 lb.	.....	10.50	9.50	10.50	10.00	11.00
Arsenate, drs 1c-1 wks.....lb.	.10	.10½	.09	.10½	09½	.13
Dithiofuroate, 100 lb dr....lb.	.....	1.00	....	1.00	....	1.00
Linoleate, solid bbls.......lb.	.26	.26½	....	....	.....	.....
Metal, c-1 NY........100 lb.	.....	4.50	3.00	4.50	2.70	3.75
Nitrate, 500 lb bbls wks....lb.	.10	.14	.10	.14	.10½	.14
Oleate, bbls..............lb.	.15	.16	.15	.16	.15	.18
Lead Oxide Litharge, 500 lb. bbls...................lb.	.....	.06	.05½	.06	.05½	.07
Red, 500 lb bbls wks....lb.	.....	.08	.06½	.08	.06½	.07
Resinate, precip., bbls...lb.	.18	.18½	....	....	.....	.....
Stearate, bbls...........lb.	.22	.23	....	....	.....	.....
White, 500 lb bbls wks...lb.	.06½	.07	.06	.07	.06	.07
Sulfate, 500 lb bbls wk...lb.	.....	.06	.05½	.06	.05½	.06
Leuna saltpetre, bags c.i.f.....ton	.....	Nom.	....	Nom	.....	Nom.
S. points c.i.f.............ton	.....	Nom.	....	Nom.	.....	Nom.
Lime, ground stone bags.....ton	.....	4.50	....	4.50	.....	4.50
Live, 325 lb bbls wks....bbl.	.....	1.70	....	....	.....	.....
Lime Salts, see Calcium Salts						
Lime-Sulfur soln bbls.......gal.	.15	.17	.15	.17	.15	.17
Linseed cake, bulk..........ton	.....	27.50	17.50	27.50	.....	.....
Linseed Meal...............ton	.....	35.70	28.00	35.70	.....	.....
Lithopone, 400 lb bbls 1c-1 wks ....lb.	.04¾	.05	.04¾	.05	.04¾	.05
Logwood, 51°, 600 lb bbls....lb.	.08½	.12½	.05	.12½	.05	.08
Solid, 50 lb boxes.........lb.	.13½	.17½	.08	.17½	.08	.12½
Sticks...................ton	24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch.............lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl...ton	50.00	60.00	46.00	60.00	50.00	60.00
Magnesium Carb, tech, 70 lb. bags NY.................lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.06½
Chloride flake, 375 lb. drs c-1 wks...................ton	34.00	36.00	34.00	36.00	35.00	36.00
Imported shipment.....ton	31.75	33.00	31.75	33.00	31.75	33.00
Fused, imp., 900 lb bbls NY ton	.....	31.00	....	31.00	.....	31.00
Fluosilicate, crys, 400 lb bbls wks....................lb.	.10	10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls ....lb.	.....	.42	....	.42	.....	.42
Heavy, 250 lb bbls......lb.	.....	.50	....	.50	.....	.50
Palmitate, bbls............lb.	.19	.23	....	....	.....	.....
Peroxide, 100 lb cs........lb.	1.00	1.25	1.00	1.25	1.00	1.25
Silicofluoride, bbls.........lb.	.08¾	.09½	.08¾	.10¼	.09¾	.10¼
Stearate, bbls.............lb.	.17	.20	.16½	.20	.16½	.26
Manganese Borate, 30%, 200 lb bbls...................lb.	.15	.16	.15	.16	.15	.19
Chloride, 600 lb casks......lb.	.07	.08	.07	.08	.07	.08½
Dioxide, tech (peroxide) drs lb.	.03¾	.06	.03½	.06	.03½	.06
Linoleate, liq. drums.......lb.	.18	.19	....	....	.....	.....
Resinate, fused, bbls.......lb.	.08¼	.08½	....	....	.....	.....
precip., bbls.............lb.	.11½	.12½	....	....	.....	.....
Sulfate, 550 lb drs NY.....lb.	.....	.08	.07	.08	.07	.08
Mangrove 55%, 400 lb bbls...lb.	.....	.04	....	.04	.....	.04
Bark, African............ton	26.50	30.00	22.00	30.00	21.00	25.00
Marble Flour, bulk.........ton	12.00	13.00	12.00	13.00	12.00	15.00
Mercurous chloride..........lb.	.....	.77	.67	.77	.67	.93
Mercury metal......76 lb flask	63.00	65.00	48.00	65.00	47.00	74.50
Meta-nitro-aniline...........lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-para-toluidine 200 lb. bbls...................lb.	1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb. bbls...................lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb. bbls...................lb.	.67	.69	.67	.69	.67	.69
Methanol, (Wood Alcohol)......						
*Crude, tanks ....gal.	.....	.20	.20	.20	.....	.....
95% tanks............gal.	.33	.35	.33	.35	.33	.35
97% tanks............gal.	.34	.39	.34	.39	.34	.39
*Pure, Synthetic drums cars gal.	.....	.39½	.37½	.39½	.37½	.41½
*Synthetic tanks..........gal.	.....	.35½	....	.35½	.....	.35½
*Denat. grade, tanks.......gal.	.....	.40	.35	.40	.....	.....
Methyl Acetate drums 82% gal.	.12	.13	.12	.13	.12	.17½
99%....................gal.	.....	.15	....	.15	.....	.15
Acetone, drums...........gal.	.54	.56	.42	.56	.47	.55
Hexyl Ketone, pure.....lb.	.....	1.20	....	1.20	.....	1.20
Anthraquinone............lb.	.65	.67	.65	.67	.65	.95
Cellosolve, (See Ethylene Glycol Mono Methyl Ether).....		.....	....	....	.....	.....
Chloride, 90 lb cyl........lb.	.45	.45	.45	.45	45	.45
Mica, dry grd. bags wks.....lb.	65.00	80.00	65.00	80.00	65.00	80.00
Michler's Ketone, kegs.......lb.	.....	2.50	2.50	3.00	.....	3 00
Molasses, blackstrap, tanks f.o.b. N. Y..............gal.	.....	.05	.05	.05	.....	.....
Monochlorobenzene, drums see, Chlorobenzene, mono .....lb.						
Monomethylparaminosulfate 100 lb drums ....lb.	3.75	4.00	3.75	4.00	3.75	4.00
Montan Wax, crude, bags....lb.	.08	.08½	.03¾	.08½	.03¾	.07
Myrobalans 25%, liq bbls....lb.	.03¾	.04½	.03¾	.04½	.03¾	.04½
50% Solid, 50 lb boxes.....lb.	.05	.05½	.05	.05½	.05	.05½

*delivered basis (east of Miss. River)

	Current Market		1933 Low	1933 High	1932 Low	1932 High
J1 bags.....ton	.....	32.00	27.00	35.00	34.00	35.00
J2 bags.....ton	.....	22.75	15.50	22.75	15.25	18.50
R2 bags.....ton	.....	22.00	15.00	22.00	14.75	17.50
Naphtha, v.m.& p. (deodorized) tanks, Group 3 tanks...gal.	.04¾	.05½	....	....	.....	.....
Bayonne, tanks.....lb.	.....	.09	.08½	.09	.08½	.10
Naphthalene balls, 250 lb bbls wks.....lb.	.05½	.06½	.05½	.06½	.03¾	.05½
Crushed, chipped bgs wks...lb.	.....	.04½	....	.04½	.....	.04½
Flakes, 175 lb bbls wks.....lb.	.....	.04¾	....	.04¾	.03¾	.04¾
Nickel Chloride, bbls.....lb.	.17	.18	.17	.18	.18	.20
Oxide, 100 lb kegs NY.....lb.	.35	.37	.35	.37	.35	.40
Salt bbl. 400 bbls lb NY...lb.	.12	.13	.11	.13	.10½	.13
Single, 400 lb bbls NY.....lb.	.12	.12	.11	.12	.10½	.12
Metal ingot.....lb.	.35	.35	.35	.35	.35	.35
Nicotine, free 40%, 8 lb tins, cases.....	8.25	10.15	....	....	.....	.....
Sulfate, 55 lb. drums.....lb.	.94	1.17	.74½	1.17	.74½	.....
Nitre Cake, bulk.....ton	12.00	14.00	10.00	14.00	10.0C	12.00
Nitrobenzene, redistilled, 1000 lb drs wks.....lb.	.09	.09½	.09	.09½	.09	.09½
Nitrocellulose, c-l-l-cl, wks....lb.	.27	.33	.27	.33	.25	.36
Nitrogenous Material, bulk.unit	2.50	3.00	1.50	3.50	1.35	1.55
Nitronaphthalene, 550 lb bbls.lb.	.24	.25	.24	.25	....	25
Nitrotoluene, 1000 lb drs wks.lb.	.17	.18	.14	.18	.14	.15
Nutgalls Aleppy, bags.....lb.	.....	.18	....	.18	.....	.18
Chinese, bags.....lb.	.17	.18	.17	.18	.17	.18
Oak Bark, ground.....ton	30.00	35.00	30.00	35.00	30.00	35.00
Whole.....ton	20.00	23.00	20.00	23.00	20.00	23.00
Extract, 25% tannin, bbls..lb.	.03⅜	.03½	....	....	.....	.....
Orange-Mineral, 1100 lb casks NY.....lb.	.....	.10¼	.09½	.10¼	.09½	.10¾
Orthoaminophenol, 50 lb kgs..lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs....lb.	1.00	1.15	1.00	1.15	1.15	1.50
Orthochlorophenol, drums....lb.	.50	.65	.50	.65	.50	.65
Orthocresol, drums.....lb.	.13	.15	.13	.15	.13	.22
Orthodichlorobenzene, 1000 lb. drums.....lb.	.05½	.06	.05½	.06	.07	.10
Orthonitrochlorobenzene, 1200 lb drs wks.....lb.	.28	.29	.28	.29	28	29
Orthonitrotoluene, 1000 lb drs wk.....lb.	.05½	.06	.05½	.06	.14	.18
Orthonitrophenol, 350 lb dr...lb.	.52	.80	.52	.90	.85	.90
Orthotoluidine, 350 lb bbl 1c-1 lb.	.14½	.20	.14½	.22	.20	22
Orthonitroparachlorphenol, tins.....lb.	.70	.75	.70	.75	.70	.75
Osage Orange, crystals.....lb.	.16	.17	.16	.17	.16	.17
51 deg. liquid.....lb.	.07	.07¾	.06	.07¾	.06	.07½
Powdered, 100 lb bags.....lb.	.14½	.15	.14½	.15	14½	.15
Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P.....lb.	.032	.034	.02	.034	.02⅝	.03
128-132 deg. M. P.....lb.	.03¼	.03⅝	.03½	.03⅝	.....	.03½
133-137 deg. M. P.....lb.	.043	.04½	.043	.04½	.04	.04¾
Para Aldehyde, 110-55 gal drs.lb.	.20½	.23	.20½	.23	.20½	.23
Aminoacetanilid, 100 lb bg..lb.	.52	.60	.52	.60	.52	.60
Aminohydrochloride, 100 lb. kegs.....lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kegs...lb.	.78	.80	.78	.80	.78	.80
Chlorophenol, drums.....lb.	.50	.65	.50	.65	.50	.65
Coumarone, 330 lb drums..lb.	.....	.....	....	....	.....	.....
Cymene, refd, 110 gal dr..gal.	2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks.....lb.	.15	.16	.15	.16	.15½	.16
Nitroacetanilid, 300 lb bbls.lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls wks.....lb.	.48	.55	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs wks.....lb.	.23½	.24	.23½	.26	.23	.26
Nitro-orthotoluidine, 300 lb. bbls.....lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol 185 lb bbls....lb.	.45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb. bbls.....lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls...lb.	.29	.31	.29	.31	.29	.31
Phenylenediamine, 350 lb bbls.....lb.	1.25	1.30	1.15	1.30	1.15	1 20
Toluenesulfonamide, 175 lb bbls.....lb.	.70	.75	.70	.75	.70	.75
Toluenesulfonchloride, 410 lb bbls wks.....lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls wk..lb.	.....	.58	....	.58	.42	.43
Paris Green, Arsenic Basis 100 lb kegs.....lb.	.....	.24	....	.24	.24	.27
250 lb kegs.....lb.	.....	.23	....	.23	.23	.25
Persian Berry Ext., bbls.....lb.	.25	Nom	.25	Nom	.25	Nom.
Pentane, normal, 28-38° C, group 3, tanks.....gal.	.....	.07	....	....	.....	.....
Pentasol (see Alcohol, Amyl)...						
Pentasol Acetate (see Amyl Acetate).....						
Petrolatum, Green, 300 lb bbl. lb.	.01⅞	.02	.01⅞	.02	.02	.02½
Petroleum Ethers, tanks 30-60°, Group 3.....gal.	.....	.10	....	.10	.....	.....
Petroleum solvents and diluents Cleaners' naphtha, Group 3, tanks.....gal.	.05¾	.06¼	.05	.07	.....	.....
Lacquer diluents, Bayonne tanks.....gal.	.12½	.12¾	.12	.12¾	.....	.....
Group 3, tanks.....gal.	.07	.07¾	.06¼	.08	.....	.....
Petroleum thinner 47-49 deg. tanks.....gal.	.04½	.05¼	....	....	.....	.....
Rubber solvent, stand. grade tanks.....gal.	.....	.05¾	.05	.06	.....	.....
Stoddard solvents 48-50 deg. tanks.....gal.	.05¼	.05½	.04½	.05¾	.....	.....
Phenol, 250-100 lb drums....lb.	.14¼	.15	.14¼	.15	.14¼	.15
Phenyl-Alpha-Naphthylamine, 100 lb kegs.....lb.	.....	1.35	....	1.35	....	1.35
Phenyl Chloride, drums.....lb.	.....	.16	....	....	.....	.....

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Phenylhydrazine Hydrochloride ....lb.	2.90	3.00	2.90	3.00	2.90	3.00
Phosphate Acid (see Superphosphate)						
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis..ton	3.10	3.25	3.10	3.25	3.10	3.25
70% basis..........ton	3.75	3.90	3.75	3.90	3.75	3.90
72% basis..........ton	4.25	4.35	4.25	4.35	4.25	4.35
75-74% basis..........ton	5.25	5.50	5.25	5.50	5.25	5.50
75% basis..........ton	.....	5.75	....	5.75	.....	5.75
77-80% basis..........ton	.....	6.25	....	6.25	.....	6.25
Tennessee, 72% basis.....ton	.....	5.00	....	5.00	.....	5.00
Phosphorous Oxychloride 175 lb cyl..........lb.	.18	.23	.18	.23	.18	.20
Red, 110 lb cases.......lb.	.....	.45	.40	.45	.40	.46
Yellow, 110 lb cases wks.lb.	.28	.33	.27½	.33	.27½	.37½
Sesquisulfide, 100 lb cs.....lb.	.38	.44	.38	.44	.38	.44
Trichloride, cylinders......lb.	.18	.23	.18	.23	.18	.20
Phthalic Anhydride, 100 lb bbls wks..........lb.	.15	.16	.15	.16	.15	.16
Pigments Metallic, Red or brown bags, bbls, Pa. wks.....ton	37.00	45.00	37.00	45.00	37.00	45.00
Pine Oil, 55 gal drums or bbls						
Destructive dist..........lb.	.59	.62	.59	.62	.59	.63
Prime bbls..........bbl.	8.00	10.60	8.00	10.60	8.00	10.60
Steam dist. bbls..........gal.	.52	.54	.52	.54	.54	.61
Pitch Hardwood wks..........ton	.....	20.00	20.00	25.00	20.00	35.00
Plaster Paris, tech, 250 lb bbls ....bbl.	3.40	3.50	3.30	3.50	3.30	3.50
Platinum, Refined..........oz.	24.00	26.00	24.00	26.00	32.00	38.00
Pontol, tanks..........per gal.	.....	.54	....	.54	.54	.54
Potash, Caustic, wks, solid...lb.	.07⅛	.07⅜	.06⅛	.07⅜	.06⅛	.06⅛
flake..........lb.	.0803	.08¼	.0705	.08¼	.0705	.08
Liquid, tanks..........lb.	.....	.03⅝	....	....	.....	.....
Potash Salts, Rough Kainit						
12.4% basis bulk.......ton	.....	9.20	....	9.20	.....	9.20
14% basis..........ton	.....	9.70	....	9.70	.....	9.70
Manure Salts..........						
20% basis bulk.........ton	.....	12.00	....	12.00	12.00	12.65
30% basis bulk.........ton	.....	19.15	....	19.15	.....	19.15
Potassium Acetate..........lb.	.27	.28	.27	.28	.27	.28
Potassium Muriate, 80% basis bags..........ton	.....	37.15	....	37.15	.....	37.15
Pot. & Mag. Sulfate, 48% basis bags..........ton	.....	27.80	....	27.80	.....	27.80
Potassium Sulfate, 90% basis bags..........ton	....	42.15	42.15	47.50	47.50	48.25
Potassium Bicarbonate, USP, 320 lb bbls..........lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb casks..........lb.	.07½	.08¼	.07½	.08¼	.07	.08½
Binoxalate, 300 lb bbls.....lb.	.14	.17	.14	.17	.14	.17
Bisulfate, 100 lb kegs......lb.	.16	.30	.16	.30	.16	.30
Carbonate, 80-85% calc. 800 lb casks..........lb.	.....	.06¾	.04⅞	.06¾	.0475	.05
Chlorate crystals, powder 112 lb keg wks..........lb.	.08½	.09	.08	.09	.08	.08½
Chloride, crys bbls........lb.	.04	.04¾	.04	.04¾	.04	.04¾
Chromate, kegs..........lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb. cases.....lb.	.55	.60	.50	.60	.50	.57½
Iodide, 75 lb. bbls..........lb.	.....	2.70	2.35	2.70	.....	.....
Metabisulfite, 300 lb. bbl...lb.	.10½	.11	.10½	.11	.10½	.13
Oxalate, bbls..........lb.	.16	.24	.16	.24	.16	.24
Perchlorate, casks wks.....lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys 500 & 100 lb drs wks..........lb.	...	.17½	.16	.17½	.16	.16½
Prussiate, red, 112 lb keg...lb.	.....	.35	.32½	.38½	.....	.38½
Yellow, 500 lb casks.....lb.	.....	.17	.16½	.17	.16½	.21
Tartrate Neut, 100 lb keg...lb.	.....	.21	....	.21	.....	.21
Titanium Oxalate, 200 lb bbls ....lb.	.21	.23	.21	.23	.21	.23
Propane, group 3, tanks..........		.07	....	.07	.....	.....
Pumice Stone, lump bags.....lb.	.04	.05	.04	.05	.04	.05
250 lb bbls..........lb.	.04½	.06	.04½	.06	.04½	.06
Powdered, 350 lb bags.....lb.	.02½	.03	.02½	.03	.02½	.03
Putty, commercial, tubs..100 lb.	2.00	2.25	2.00	2.25	2.00	2.45
Linseed Oil, kegs......100 lb.	3.40	3.50	3.40	3.50	3.40	4.75
Pyridine, 50 gal drums....gal.	.85	.95	.85	.95	.85	1.25
Pyrites, Spanish cif Atlantic ports bulk..........unit	.12	.13	.12	.13	.12	.13
Quebracho, 35% liquid tks...lb.	.02	.02⅜	.02	.02¼	.02	.03
450 lb bbls c-l..........lb.	.02½	.02⅞	.02⅜	.02¾	.02½	.03¾
Solid, 63%, 100 lb bales cif..lb.	.....	.03	.02⅜	.03	.02	.02½
Clarified, 64%, bales...lb.	.03⅛	.03¼	.02⅞	.03¼	.02½	.03⅛
Quercitron, 51 deg liquid 450 lb bbls..........lb.	.05½	.06	.05½	.06	.05½	.06
Solid, 100 lb boxes........lb.	.09½	.13	.09½	.13	.09½	.13
Bark, Rough..........ton	.....	14.00	....	14.00	.....	14.00
Ground..........ton	34.00	35.00	34.00	35.00	34.00	35.00
R Salt, 250 lb bbls wks......lb.	.40	.44	.40	.44	40	.44
Red Sanders Wood, grd bbls. lb.	.....	.18	....	.18	.....	.18
Resorcinol Tech, cans........lb.	.65	.70	.65	.70	.65	.70
Rochelle Salt, cryst..........lb.	.....	.12½	....	....	.....	.....
Rosin Oil, 50 gal bbls, first run ....gal.	.44	.46	.42	.46	.41	.45
Second run..........gal.	.49	.51	.46	.51	.45	.51
Rosin						
Rosins 600 lb bbls 280 lb.....unit ex. yard N. Y.						
B..........		5.15	2.75	5.15	2.95	3.65
D..........		5.15	2.95	5.15	3.15	3.75
E..........		5.15	3.55	5.15	3.37½	4.00
F..........		5.17½	3.85	5.17½	3.40	4.15
G..........		5.17½	3.90	5.17½	3.45	4.15
H..........		5.17½	4.00	5.17½	3.45	4.20
I..........		5.20	4.05	5.20	3.47½	4.25
K..........		5.20	4.60	5.20	3.60	4.65
M..........		5.20	4.35	5.20	4.20	5.25
N..........		5.25	4.75	5.30	4.65	6.05

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Rosin, WG		5.30	4.80	5.60	5.25	6.45
WW		5.55	4.85	6.20	5.85	6.65
Rotten Stone, bags mines....ton	23.50	24.00	23.50	24.00	20.00	23.00
Lump, imported, bbls......lb.	.05	.07	.05	.07	.05	.07
Selected bbls...........lb.	.09	.12	.09	.12	.09	.12
Powdered, bbls...........lb.	.02½	.05	.02	.05	.02	.05
Sago Flour, 150 lb bags......lb.	.02½	.03	.02½	.03	.02½	.04
Sal Soda, bbls wks......100 lb.	.90	1.00	.90	1.00	.90	1.00
Salt Cake, 94-96% c-1 wks...ton	13.00	18.00	13.00	18.00	13.00	15.50
Chrome...............ton	12.00	13.00	12.00	13.00	12.00	14.50
Saltpetre, double refd granular 450-500 lb bbls..........lb.	.05¾	.06	.05¾	.06¾	.06	.06¾
Satin, White, 500 lb bbls.....lb.	.....	.01½	....	.01½	.....	.01½
Shellac Bone dry bbls........lb.	.....	.24	.18	.24	.16	.26
Garnet, bags..............lb.	.19	.20	.15	.20	.15	.20
Superfine, bags...........lb.	.18	.18¾	.09½	.18¾	.10	.14
T. N. bags................lb.	.17	.17¾	.08½	.17¾	.09	.13
Schaeffer's Salt kegs........lb.	.48	.50	.48	.50	.48	.50
Silica, Crude, bulk mines....ton	8.00	11.00	8.00	11.00	8.00	11.00
Refined, floated bags......ton	22.00	30.00	22.00	30.00	22.00	30.00
Air floated bags........ton	.....	32.00	....	32.00	.....	32.00
Extra floated bags......ton	30.00	35.00	30.00	35.00	30.00	40.00
Silver......................oz.	.....	.35⅜	....	....	.....	.....
Silver Nitrate, vials.........oz.	.....	.26⅞	....	....	.....	.....
Soapstone, Powdered, bags f.o.b. mines..................ton	15.00	22.00	15.00	22.00	15.00	22.00
Soda Ash, 58% dense, bags c-1 wks...............100 lb.	.....	1.17½	....	1.17½	1.17½	.....
58% light, bags.......100 lb.	1.15	1.20	1.15	1.20	1.15	1.20
Soda Caustic, 76% grnd & flake drums.............100 lb.	2.90	3.00	2.90	3.00	2.90	3.00
76% solid drs.........100 lb.	2.50	2.55	2.50	2.55	2.50	2.55
Liquid sellers tanks, 100 bls.	2.15	2.20	2.15	2.20	.....	.....
Sodium Abietate, drs........lb.	.....	.03	....	.03	.....	.03
Acetate, tech 450 lb. bbls wks lb.	.04¾	.05	.04½	.05	.04½	.05
Alignate, drs..............lb.	.....	.50	....	.50	.....	.50
Arsenate, drums..........lb.	.07¾	.08¾	.07¾	.08¾	.....	.....
Arsenite, drums..........gal.	.50	.75	.05	.75	.50	.75
Benzoate U.S.P., kegs......lb.	.40	.42	....	....	.....	.....
Bicarb, 400 lb bbl.....100 lb.	.....	2.25	....	2.25	.....	2.25
Bichromate, 500 lb cks wks lb.	.04¾	.05½	.044	.05½	.044	.05¾
Bisulfite, 500 lb bbl wks....lb.	.03	.0335	.02¾	.0335	.03	.04
Chlorate, wks.............lb.	.05¾	.07¾	.05¾	.07¾	.05¾	.07¾
Chloride, technical.......ton	11.40	14.00	11.40	14.00	12.00	13.00
Cyanide, 96-98%, 100 & 250 lb drums wks...........lb.	.15½	.16	.15½	.16	.15½	.17
Fluoride, 300 lb bbls wks....lb.	.07	.07½	.07	.07½	.07	.07½
Hydrosulfite, 200 lb bbls f.o.b. wks.................lb.	.20	.21	.20	.21	.21	.24
Hypochloride solution, 100 lb. cbys.................lb.	.....	.05	....	.05	.....	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks......100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Technical, regular crystals 375 lb bbls wks....100 lb.	2.40	2.65	2.40	2.65	2.40	2.65
Iodide,....................lb.	.....	3.50	3.10	3.50	.....	.....
Metanilate, 150 lb bbls....lb.	.44	.45	.44	.45	.44	.45
Metasilicate, c-1, wks..100 lb.	2.85	3.25	2.85	3.25	2.85	4.00
Monohydrate, bbls.........lb.	.....	.02½	....	.02½	.....	.02½
Naphthionate, 300 lb bbl...lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb. bags c-1 NY .....100 lb.	.....	1.26	1.26	1.31	1.185	1.73½
100 lb. bags lb........ton	.....	25.90	....	....	.....	.....
Bulk..................ton	.....	23.90	....	....	.....	.....
Nitrite, 500 lb bbls spot....lb.	.07½	.08	.07½	.08	.07½	.08
Orthochlorotoluene, sulfonate, 175 lb bbls wks.......lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls.....lb.	.17	.19	.17	.19	.17	.20
Phosphate, di-sodium, tech. 310 lb bbls.......100 lb.	2.20	2.40	2.00	2.40	2.00	2.75
tri-sodium, tech, 325 lb bbls...............100 lb.	.....	2.50	2.15	2.50	2.15	3.20
Picramate, 160 lb kegs ....lb.	.69	.72	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bbl wks.................lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, 100 lb keg..lb.	.15	.20	.15	.20	.15	.20
Silicate, 60 deg 55 gal drs, wks ....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40 deg 55 gal drs, wks ....100 lb.	.....	.75	....	.75	.....	.75
Silicofluoride, 450 lb bbls NY ....lb.	.04½	.06	.04½	.06	.05½	.06¾
Stannate, 100 lb drums.....lb.	.30½	.33	.18	.33	.17	.19
Stearate, bbls.............lb.	.20	.25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls.....lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-1 wks..............lb.	.02	.02¾	.02	.02¾	.02	.02¾
Sulfide, 80% crystals, 440 lb bbls wks.............lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
62% solid, 650 lb drums 1c-1 wks.............lb.	.03	.03½	.03	.03½	.03	.03½
Sulfite, crystals, 400 lb bbls wks.................lb.	.03	.03½	.03	.03½	.03	.03½
Sulfocyanide, bbls ....lb.	.28	.35	.28	.35	.28	.35
Tungstate, tech, crystals, kegs ....lb.	.57	.67	.57	.67	.60	.88
Spermaceti, blocks, cases.....lb.	.21	.22	.17	.22	.....	.....
Cakes, cases..............lb.	.22	.23	.18	.23	.....	.....
Spruce Extract, ord., tanks..lb.	.....	.00⅞	....	.00⅞	.00⅞	.01
Ordinary, bbls............lb.	.....	.01½	....	.01½	.01½	.01¾
Super spruce ext., tanks...lb.	.....	.01¼	....	.01¼	.01¼	.01⅜
Super spruce ext., bbls....lb.	.....	.01⅞	....	.01⅞	.01⅞	.01⅞
Super spruce ext. powd., bags ....lb.	.....	.04	....	.04	.04	.04½
Starch, powd, 140 lb bags ....100 lb.	2.84	2.95	2.29	2.95	2.29	2.67
Pearl, 140 lb bags.....100 lb.	2.74	2.85	2.19	2.85	2.19	2.84
Potato, 200 lb bags........lb.	.05¼	.06	.03¾	.06	.03¾	.06
Imported bags..........lb.	.06	.06½	.04¾	.06½	.04	.06½

Prices

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Starch, Potato Soluble ......lb.	.08	.08½	.08	.08½	.08	.08½
Rice, 200 lb bbls..........lb.	.07½	.08½	.07	.08½	.07½	.10
Wheat, thick bags.........lb.	.06¼	.06¾	.05¾	.06¾	.06	.07
Thin bags..............lb.	.10	.10¼	.09½	.10¼	.09½	.10
Strontium carbonate, 600 lb bbls wks.....................lb.	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY....lb.	.07¼	.07½	.07	.07½	.07	.07½
Peroxide, 100 lb drs.......lb.		1.25	....	1.25	.....	1.25
Sulfur Brimstone, broken rock, 250 lb bag c-1.......100 lb.		2.05	....	2.05	.....	2.05
Crude, f. o. b. mines......ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour for dusting 99½%, 100 lb bags c-1 NY....100 lb.		2.40	....	2.40	.....	2.40
Heavy bags c-1.....100 lb.		2.50	....	2.50	.....	2.50
Flowers, 100%, 155 lb bbls c-1 NY..............100 lb.		3.45	....	3.45	...	3.45
Roll, bbls 1c-1 NY....100 lb.	2.65	2.85	2.65	2.85	2.65	2.85
Sulfur Chloride, red, 700 lb drs wks....................lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs wks.....lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl....lb.	.07	.07½	.07	.07½	.07	.07½
Extra, dry, 100 lb cyl......lb.	.10	.12	.10	.12	.10	.12
Sulfuryl Chloride............lb.	.15	.40	.15	.40	.15	.40
Sumac, ground.............ton		50.00	....	....	....	.....
Talc, Crude, 100 lb bgs NY..ton	12.00	15.00	12.00	15.00	12.00	15.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bags NY....ton	18.00	22.00	18.00	22.00	18.00	22.00
Refined, white, bags....ton	35.00	40.00	35.00	40.00	35.00	40.00
Italian, 220 lb bags NY...ton	48.50	50.00	48.50	50.00	40.0C	50.00
Refined, white bags.....ton	50.00	55.00	50.00	55.00	50.00	55.00
Superphosphate, 16% bulk, wks....................ton	7.50	8.00	6.50	8.00	7.00	8.00
Run of pile..............ton	7.00	7.50	6.00	7.50	.....	.....
Tankage Ground NY.......unit		2.75*	1.70	2.75*	1.30	1.50
Unground............unit		2.60	....	2.60	.....	.....
High grade f.o.b. Chicago.unit		3.00*	1.40	3.00	1.00	1.80
South American cif......unit		3.25*	....	2.50	1.80	2.25
Tapioca Flour, high grade bgs.lb	.03	.05	.03	.05	.03½	.05
Medium grade, bags.....lb.	.03	.04	.03	.04	.03	04
Tar Acid Oil, 15%, drums...gal.	.21	.22	.21	.22	.21	.22
25% drums.............gal.	.23	.24	.23	.24	.23	.24
Tartar Emetic, Tech......gal.		.21	....	....	....	.....
U. S. P...............gal.		.26	....	....	....	.....
Terra Alba Amer. No. 1, bgs or bbls mills.........100 lb.	1.15	1.75	1.15	1.75	1.15	1.75
No. 2 bags or bbls...100 lb.	1.00	1.25	1.00	1.25	1.50	2.00
Imported bags............lb.	.01⅛	.01¼	.01⅛	.01¼	.01⅛	.01¼
Tetrachlorethane, 50 gal dr...lb.	.08½	.09	.08½	.09	.08	.09½
Tetralene, 50 gal drs wks.....lb.	.12	.13	.12	.13	.12	.20
Thiocarbanilid, 170 lb bbl....lb.	.25	.28½	.25	.28½	.25	.28½
Tin.........................						
Crystals, 500 lb bbls wks...lb.	.35½	.36	.24	.37	.22	.25
Metal Straits NY.........lb.		.44⅝	.23	.48	.211	.24½
Oxide, 300 lb bbls wks.....lb.	.50	.52	.27½	.52	.23	.26½
Tetrachloride, 100 lb drs wks ....lb.	.22¼	.22⅞	.126	.22⅞	.1420	.1457
Titanium Dioxide 300 lb bbl...lb.	.17¼	.19¼	.17¼	.19¼	.17¼	.21
Calcium Pigment, bbls.......lb.	.06¼	.06½	.06¼	.06½	.06¼	.07¾
Toluene, 110 gal drs.........gal.		.35	....	.35	.....	.35
8000 gal tank cars wks....gal.		.30	....	.30	.....	.30
Toluidine, 350 lb bbls........lb.	.88	.89	.88	.89	.88	.89
Mixed, 900 lb drs wks.....lb.	.27	.28	.27	.28	.27	.32
Toner Lithol, red, bbls.......lb.	.80	.85	.80	.95	.90	.95
Para, red, bbls............lb.		.80	....	.80	.....	.80
Toluidine ....lb.		1.35	1.35	1.55	1.50	1.55
Triacetin, 50 gal drs wks.....lb.	.32	.36	.32	.36	.32	.36
Trichlorethylene, 50 gal dr...lb.	.09½	.10	.09½	.10	.10	.10½
Triethanolamine, 50 gal drs...lb.	.35	.38	.35	.38	.35	.42
Tricresyl Phosphate, drs.....lb.	.19	.26	.19	.26	.21	.26
Triphenyl guanidine.........lb.	.58	.60	.58	.60	.58	.60
Phosphate, drums.........lb.	.37	.39	.37	.39	.50	.65
Tripoli, 500 lb bbls......100 lb.	.75	2.00	.75	2.00	.75	2.00
Tungsten, Wolframite..per unit	10.00	11.00	10.00	11.00	10.00	11.75
Turpentine carlots, N. Y. dock bbls. ....gal.		.51½	.46¼	.51½	.39	.47¾
Savannah, bbls..........gal.		.45	....	....	.....	.....
Jacksonville, bbls.........gal.		45½	....	....	.....	.....
Wood Steam dist, bbls....gal.		.462	.42	.462	.42	.46
Urea, pure, 112 lb cases......lb.	.15	.17	.15	.17	.15	.17
Fert. grade, bags c.i.f......ton		82.60	....	82.60	.....	82.60
c. i. f. S. points........ton		82.60	....	82.60	.....	82.60
Urea Ammonia liq. 55% NH_3, tanks,...............unit		.96	....	....	.....	.....
Valonia Beard, 42%, tannin bags...................ton		35.00	27.50	35.00	28.50	34.00
Cups, 30-31% tannin.....ton		23.50	17.00	23.50	19.00	23.50
Mixture, bark, bags......ton		27.00	22.00	27.00	22.00	26.00
Vermillion, English, kegs.....lb.	1.29	1.36	1.05	1.40	1.28	1.80
Vinyl Chloride, 16 lb cyl.....lb.		1.00	....	1.00	.....	1.00
Wattle Bark, bags..........ton		28.00	24.00	28.00	26.00	33.00
Extract 55%, tanks, bbls...lb.	.03¼	.03¾	.03	.03½	.03	.06½
Whiting, 200 lb bags, c-1 wks ....100 lb.	.85	1.00	.85	1.00	.85	1.00
Alba, bags c-1 NY.......ton		13.00	....	13.00	.....	13.00
Gilders, bags c-1 NY...100 lb.		1.35	....	1.35	.....	1.35
Wood Flour, c-l...........bags	18.00†	30.00	18.00	36.00	.....	.....
Xylene, 10 deg tanks wks...gal.	.27	.29	.27	.29	.....	.29
Commercial, tanks wks...gal.		.26	....	.26	.....	.26
Xylidine, crude.............lb.	.36	.37	.36	.37	.36	.37
Zinc Ammonium Chloride powd., 400 lb bbls............lb.	.04¾	.05	.04¾	.05	.....	5.75
Carbonate Tech. bbls NY..lb.	.09½	.11	.09½	.11	.09½	.11
Chloride Fused, 600 lb drs wks....................lb.	.05	.05¾	.05	.05¾	.05	.06
Gran, 500 lb bbls wks.....lb.	.05⅝	.06	.05⅝	.06	.05⅝	.06
Soln 50%, tanks wks...100 lb.		3.00	....	3.00	2.25	3.00
Cyanide, 100 lb drums.....lb.	.38	.39	.38	.39	.38	.39
Dithiofuroate, 100 lb dr....lb.		1.00	....	1.00	.....	1.00

*&10 †Depends upon grade

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Zinc Dust, 500 lb bbls c-1 wks ... lb.	.06½	.06¾	.04¾	.07½	.041	0525
Metal, high grade slabs c-1 NY ... 100 lb.	.....	5.37	3.02	5.37	2.87	3.52
Oxide, American bags wk ... lb.	.05	.06	.05	.06	.0485	.07
French, 300 lb bbls wks ... lb.	.05¾	.11⅛	.05¾	.11⅛	.08⅛	.11
Palmitate, bbls ... lb.	.18	.19	.17½	.19	.....	.....
Perborate, 100 lb drs ... lb.	.....	1.25	....	1.25	.....	1 25
Peroxide, 100 lb drs ... lb.	.....	1.25	....	1.25	.....	1.25
Resinate, fused, dark, bbls. lb.	.05¾	.06½	.05¾	.06½	.....	.....
Stearate, 50 lb bbls ... lb.	.17	.18	.15	.18	.16	.22
Sulfate, 400 bbl wks ... lb.	.03	.03½	.03	.03½	.03	.03½
Sulfide, 500 lb bbls ... lb.	.13	.13½	.12	.13½	.12	.13½
Sulfocarbolate, 100 lb keg ... lb.	.21	.22	.21	.22	.21	.24
Zirconium Oxide, Nat. kegs ... lb.	.02½	.03	.02½	.03	.02½	.03
Pure kegs ... lb.	.45	.50	.45	.50	.45	.50
Semi-refined kegs ... lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

	Current Market		1933 Low	1933 High	1932 Low	1932 High
Castor, No. 1, 400 lb bbls ... lb.	.....	.09¾	.09¼	.10	.09½	.10¼
No. 3, 400 lb bbls ... lb.	.09¾	.09	.08½	.09¾	.08¾	.10½
Blown, 400 lb bbls ... lb.	.12¾	.12¾	.11¼	.12¾	.11¼	.12½
China Wood, bbls spot NY ... lb.	.09	.09⅛	.04¼	.09⅛	.05½	.07¾
Tanks, spot NY ... lb.	.08⅜	.08½	.04¼	.08½	.04½	.06⅞
Coast, tanks ... lb.	.08	.08⅛	.04⅛	.08⅛	.04¼	.06½
Coconut, edible, bbls NY ... lb.	.....	.10¾	....	.10¾	.....	.10¾
Ceylon, 375 lb bbls NY ... lb.	.04½	.04⅝	.04	.04¾	.04	.04¾
8000 gal tanks NY ... lb.	.....	.03¼	.03	.03⅜	.02⅞	.03⅞
Cochin, 375 lb bbls NY ... lb.	.05	Nom.	.04½	.05¼	.04½	.06
TanksN Y ... lb.	.05	Nom.	.04	.05	.03½	.05
Manila, bbls NY ... lb.	.04½	.04⅝	.04	.04¾	.04	.05
Tanks NY ... lb.	.03⅝	.03¾	.03⅛	.03¾	.03¼	.04
Tanks, Pacific Coast ... lb.	.03¼	.03⅜	.02¾	.03⅜	.02⅞	.03½
Cod, Newfoundland, 50 gal bbls ... gal.	No stocks		.19	.25	.21	.30
Copra, bags, N. Y. ... lb.	.....	.017	.016	.019	.0175	.0235
Corn, crude, bbls NY ... lb.	.07⅝	.07¾	.05¼	.07¾	.04½	.09
Tanks, mills ... lb.	.06¼	.06½	.02⅞	.06½	.02¾	.04½
Refined, 375 lb bbls NY ... lb.	.08½	.08¾	.06¼	.08¾	.05½	.07
Cottonseed, crude, mill Southeast & Valley ... lb.	.....	.04¼	.02⅝	.05	.02⅝	.04⅛
Texas ... lb.	.....	.04½	....	....	....	.....
Degras, American, 50 gal bbls NY ... lb.	.....	.02¾	.02½	.03	.02½	.04
English, brown, bbls NY ... lb.	.03¾	.04	.02⅞	.04	.02⅞	.04
Greases, Brown ... lb.	.02	.02⅛	.02	.02⅛	.01⅞	.02¾
Yellow ... lb.	.03½	.03⅝	.01¾	.03⅝	.01⅞	.03
White, choice bbls NY ... lb.	.04¼	.04⅝	.02½	.04⅝	.02	.04½
Herring, Coast, Tanks ... gal.	.....	.23	.11	.23	.....	.....
Lard Oil, edible, prime ... lb.	.....	.10½	.08½	.10½	.08¼	.10
Extra, bbls ... lb.	.....	.08¼	.07½	.08¼	.05¾	.07¾
Extra No. 1, bbls ... lb.	.....	.08	.06	.08	.05½	.07
Linseed, Raw, five bbl lots ... lb.	.....	.12	.08	.12	.061	.078
Bbls c-1 spot ... lb.	.....	.108	.072	.11	.053	.07
Tanks ... lb.	.....	.102	.066	.104	.047	.064
Menhaden Tanks, Baltimore. gal.	.17	Nom.	.09	.15	.09½	.20
Refined, alkali bbl ... lb.	.065	.071	....	....	....	.....
Tanks ... lb.	.....	.061	....	....	....	.....
Light Pressed, bbls ... lb.	.053	....	....	....	....	.....
Tanks ... lb.	.....	.049	....	....	....	.....
Neatsfoot, CT, 20° bbls NY ... lb.	.....	.16½	.11¾	.16½	.11¼	.13½
Extra, bbls NY ... lb.	.....	.08¼	.06½	.08¼	.05¾	.07
Pure, bbls NY ... lb.	.....	.14	.07¾	.14	.07¾	.09
Oleo, No. 1, bbls NY ... lb.	.06⅝	.06¾	.05	.06¾	.05⅝	.07
No. 2, bbls NY ... lb.	.....	.06⅛	.04¼	.06⅛	.04¾	.06
Olive, denatured, bbls NY ... gal.	.....	.75	.47	.75	.51	65
Edible, bbls NY ... gal.	1.55	1.75	1.30	1.75	1.25	2.00
Foots, bbls NY ... lb.	.06¼	.06¾	.04⅜	.06¾	.04½	.05
Palm, Kernel Casks ... lb.	.04	Nom.	.04	.04¾	.035	.04⅞
Lagos, 1500 lb casks ... lb.	.04⅝	.04¾	.02⅝	.04¾	.03	.05
Niger, Casks ... lb.	.04⅜	.04½	.024	.04½	.03	.03½
Peanut, crude, bbls NY ... lb.	.07¼	Nom.	.03⅛	.07	.02¾	.04½
Refined, bbls NY ... lb.	.08¾	.11	.08½	.11	.08½	.09
Perilla, bbls NY ... lb.	.10¼	.10½	.05	.10½	.03¾	.05¾
Tanks, Coast ... lb.	.09⅜	Nom.	.03¾	.06½	.03½	.05
Poppyseed, bbls NY ... gal.	1.55	1.70	1.55	1.70	1.60	1.75
Rapeseed, in bond, bbls NY. gal.	.40	.43	.33	.43	.....	.....
denatured, drms, NY ... gal.	.62	.65	.34	.65	.....	.....
Red, Distilled, bbls ... lb.	.07	.07⅝	.05⅛	.07⅝	.06⅛	.07
Tanks ... lb.	.....	.06	.05	.06	.05¼	.06
Salmon, Coast, 8000 gal tks. gal.	.23	Nom.	.11	.18	.11	.19
Sardine, Pacific Coast tks ... gal.	.24	Nom.	.09½	.20	.09½	.17½
Sesame, edible, yellow, dos ... lb.	.09½	.10	.09½	.10	.08½	.09½
White, dos ... lb.	.10	.11	.10	.11	.10	.11
Sod, bbls NY ... gal.	.....	.40	....	.40	.....	.40
Soy Bean, crude ...						
Pacific Coast ... lb.	.....	Nom.	.032	.035	.02¾	.03½
Domestic tanks, f.o.b. mills, lb.	.....	.085	.027	.085	.03	.032
Crude, bbls NY ... lb.	.091	.095	.04	.095	.03¾	.05
Refined, bbls NY ... lb.	.096	.106	.04½	.106	.04½	.06
Sperm, 38° CT, bleached, bbls NY ... lb.	.103	.105	....	....	.....	.....
45° CT, bleached, bbls NY ... lb.	.096	.098	....	....	.....	.....
Stearic Acid, double pressed dist bags ... lb.	.09½	.10	.07½	.10	.07½	.09
Double pressed saponified bags ... lb.	.09½	.10	.08	.10	.07	.08½
Triple, pressed dist bags ... lb.	.12¼	.12¾	.10¼	.12¾	.10¼	.11
Stearine, Oleo, bbls ... lb.	.06½	.06¾	.03½	.06¾	.03¾	.06
Tallow City, extra loose ... lb.	.....	.03⅞	.02	.03⅞	.02¼	.03⅞
Edible, tierces ... lb.	.....	.05⅛	.03½	.05⅛	.03⅛	.04¼
Tallow Oil, Bbls, c-1 NY ... lb.	.05¾	.06	.05¾	.06	.05¾	.07½
Acidless, tanks NY ... lb.	.....	.07¼	.05	.07¼	.06	.09
Vegetable, Coast mats ... lb.	.04½	Nom.	.04½	Nom.	.06	Nom.
Turkey Red, single bbls ... lb.	.07½	....	.06¼	.07½	.06¼	.09
Double, bbls ... lb.	.13	.09	.08	.13	.08	.11
Whale, ...						
Winter bleached, bbls, NY ... lb.	.068	.07	....	....	.....	.....
Refined natural, bbls, NY ... lb.	.072	.074	....	....	.....	.....

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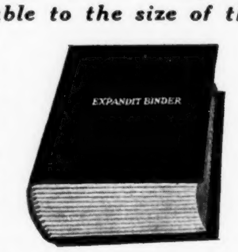

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